Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

VOL. XIII. NEW YORK, SEPTEMBER 26, 1857. NO. 3.

THE
SCIENTIFIC AMERICAN,
PUBLISHED WEEKLY
At No. 128 Fulton street, (Sun Buildings,) New York,
BY MUNN & CO.

O. D. MUNN, S. H. WALES, A. E. BEACH.

Responsible Agents may also be found in all the principal cities and towns in the United States.

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Single copies of the paper are on sale at the office of publication and at all the periodical stores in this city, Brooklyn and Jersey City.

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Coal Gas.

The New York Gas-light Company have in operation three retort houses, containing 504 retorts, and over 160 furnaces. There are also purifying and condensing houses, together with the usual number of workshops and offices. They have two large chimneys over 150 feet high, with six telescope gasometers, exclusive of six distributing gasometers, at different parts of their district, which hold over 1,500,000 cubic feet of gas The total cost of these works amounts to over $500,000.

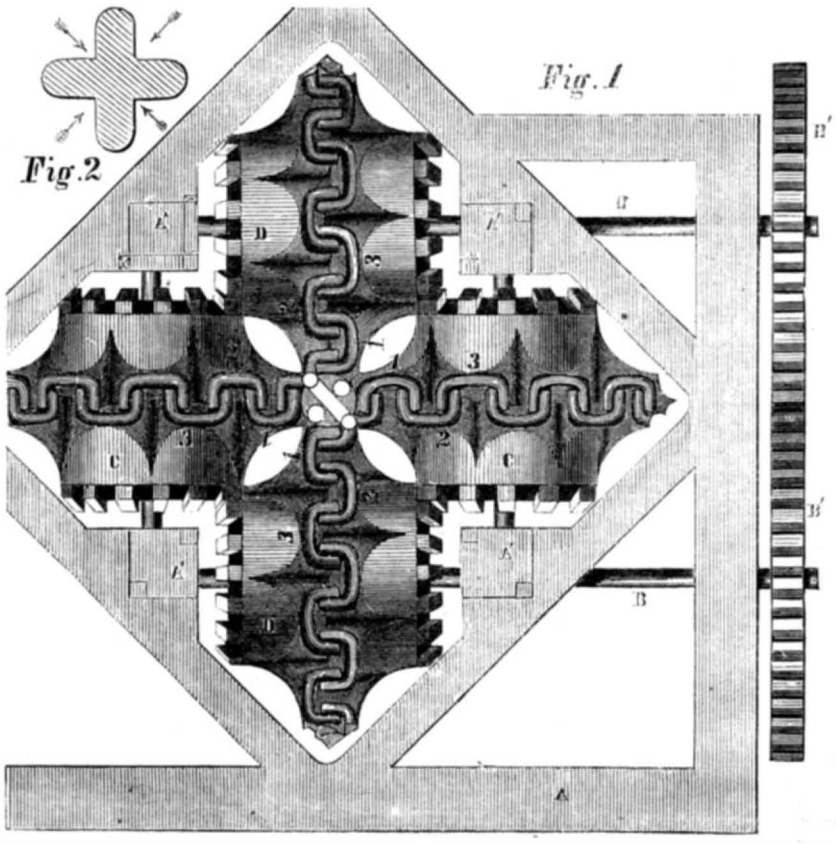
The company employs about 400 men, and manufactures 150,000,000 cubic feet of gas per year, consuming about 40,000 tuns of coal, from which over 25,000 tuns of coke are produced. Before 1849, the company manufactured their gas from oil and rosin, but now they use two-thirds of Cannel and one-third of Newcastle coal, and when the gasometers are not large enough to contain what is manufactured, the Cannel coal is exclusively used, as it is purer and makes more gas, although its market price is somewhat higher than Newcastle.

The process of manufacturing gas is as follows:—A panful of coal is put into an iron retort, under which is a furnace that heats the retort red hot, turning the coal partly into gas and partly into coke. The latter remains in the retort, while the gas passes out through a pipe half filled with water, called the hydraulic main, the force in the retort being sufficient to drive it through the water and over the surface; but it cannot pass back, as the water acts as a seal to secure it. Thence it is conducted into a condensing pipe to the condensing house, where its heat and volume are reduced. It is then transmitted to the purifying house, where it passes through three distinct beds of dry lime, which extract the sulphurous particles from it. There are test cocks attached to the purifiers, by which its purity is tested. The cock is turned to let gas out, and a piece of paper saturated in a solution of sugar of lead held over it, and if it stains the paper, it is impure. It is said that sugar of lead will detect one impure part in 40,000 cubic feet. The gas, when purified, is conveyed to the gasometer, from which it is distributed into the pipes throughout the city.

The company have over 125 miles of pipe laid, covering the whole of their district, which consists of all that part of the city south of Grand street.

The lecture hall of the Smithsonian Institution at Washington, D. C., is built in the form of a speaking trumpet; the lecturer stands, as it were, in the smaller end, and the slightest whisper can be heard all over the room. It was constructed under the direction of Professors Henry and Bache, and is a triumph of acoustical science applied to public buildings.

SLEPPY'S CHAIN-MAKING MACHINE.



Chain-making is an important manufacture, and on the strength and compactness of chains often depends a cargo of precious merchandize, the success of some great engineering undertaking, or, in fact, any of the thousand articles of worth that are daily being pulled, transported, or raised by this means. For all purposes where chains are employed, it is desirable to have them strong and cheap, therefore, wherever we can introduce machinery into their manufacture, we secure both. The ordinary process of forging a chain of any dimension is a tedious one. The bar of metal is heated to welding heat, and then the end bent in the form of a hook, which is cut off and welded into round or oval form; another piece of the bar is then taken and bent, cut and passed through the already formed link, and in its turn welded together, and so on to whatever length is desired.

The machine which is shown in our engraving is one which cuts a perfect chain out of a bar of metal. In Fig. 1, A is the frame. B B are the axles which are connected with the gearing wheels, B′ B′. C C are two solid iron wheels, working in boxes, A′, at right angles to D D. These four wheels, D D and C C, turn one another by means of cogs, and revolving the same way, meet in the center. On their edges are cut a series of grooves or dies, each forming one quarter of a link; thus when dies, 1 1 1 1, meet at the center, in turning round, any plastic material interposed would be cut by them into a link of a chain as would 2 2 2 2 or 3 3 3 3.

The operation is as follows:—A bar of iron or other metal heated to the welding heat, having the section shown in Fig. 2 is passed through the center of the wheels, D D and C C, which in revolving carry the bar downwards with them. In consequence of the dies or impressions on the periphery, however, it is cut; and as each die is the quarter of a link when it is met by the four dies, the bar is cut into a perfect link, and this link cutting goes on as long as the bar is fed, thus turning out a chain of any length that may be desired. It may be driven by any convenient power, either steam, water or horse. The arrows in Fig. 2 indicate the direction of the pressure in the cutting process.

For further information and particulars, address the inventor and patentee, Christian Sleppy, Wilkesbarre, Pa.

Bank Note Paper.

A Bank of England note has some peculiar and interesting characteristics of manufacture, the paper being distinguished by its color, which is a peculiar white, such as is neither sold in the shops nor used for any other purpose; by its thinness and transparency, qualities which prevent any of the printed part of the note being washed out by turpentine, or removed by the knife, unless a hole is made in the place thus practiced on; by its characteristic feel, a peculiar crispness and toughness, by which those accustomed to handle it distinguish the true notes instantly; the wire or water mark, which is produced on the paper when in the state of pulp, and which is easily distinguished from a mark stamped on after the paper is completed; the three "deckle" edges—the mold contains two notes placed lengthwise, which are separated by a knife at a future stage of the process, this deckle or wooden frame of the paper mold producing the peculiar effect seen on the edges of uncut paper, and this edging being caused when the paper is in a state of pulp, precludes any successful imitation after the paper is made; also by the strength of the paper, which is made from new linen and cotton. In its "water leaf," or unsized condition, a bank note will support thirty-six pounds; and when one grain of size has been diffused through it, it will lift half a hundred weight.

If a little more care was taken by our State governments in regard to what sort of paper should be used in the printing of bank notes, the people would suffer much less from the spurious stuff now in circulation. In some respects we are a heedless people, and have yet something to learn from the old nations of Europe.

Brooklyn Water Works.

Water-works to supply the neighboring city of Brooklyn, Long Island, with water have been under contract for upwards of a year, but they appear at this date to be progressing very slowly. The plan is to obtain the water by collecting together several mill streams on the lower side of the island, and to lead them either in an open canal or closed conduit to a low point near the city, from which the water is to be forced up by steam pumping to the top of the highest ground in the vicinity, from whence pipes are to supply the city. The reservoir on this hill is partly finished, the canal partly excavated, and any quantity of designs and estimates have been received for the pumping apparatus, but nothing further has transpired, and we hear it reported that the extreme low level at which the canal will have to run has been found to involve such serious difficulties that it is contemplated to change the plan, and at an expense of a million dollars more, to substitute a canal running at a level higher than the streams, with a pumping engine at each stream, to elevate the water into it.

What is it?

One of the *savans* at the late convention of scientific men at Montreal insisted that coal was not of vegetable origin. All geologists at the present time say that it is, and we should like to know how he accounts for the gigantic ferns and monster pine trees which are found in nearly all coal formations, and seem to point directly to its vegetable origin. Soft coal is full of these, while anthracite contains comparatively few. This may be accounted for by the compact and hard nature of the latter, which would indicate that it has been subjected to greater pressure and changes in other ways sufficient to remove all traces of fossils either of animals or plants. There is, however, nothing like differing from the rest of the world, if you wish to be thought profound. We wish this wise one had given us his idea of what coal *did* originate from, for it is not good policy to pull down one system without you have another to build up in its place.

Science among the Japanese.

M. Von Siebold, the distinguished scientific author, states that the knowledge of the natural sciences amongst the Japanese is much more extensive and profound than is generally supposed. They possess a great many learned treatises thereupon, and an admirable geological map of their island by Buntsjo. They are well acquainted with the systems of European naturalists, and have translations of the more important of their works. They have also a botanical dictionary, in which an account is given of not fewer than 5,300 objects, and is embellished with numerous fine engravings.

Mr. J. R. Baird, of Vincennes, Ind., has sent us a specimen of his daughter's work*womans*hip—one of the most skillful and ingenious pieces of lady's work we have ever seen. It consists in four stockings, knitted at one operation, on only four needles. The stockings are one inside the other, and each distinct and separate. It is now on exhibition at the Crystal Palace.

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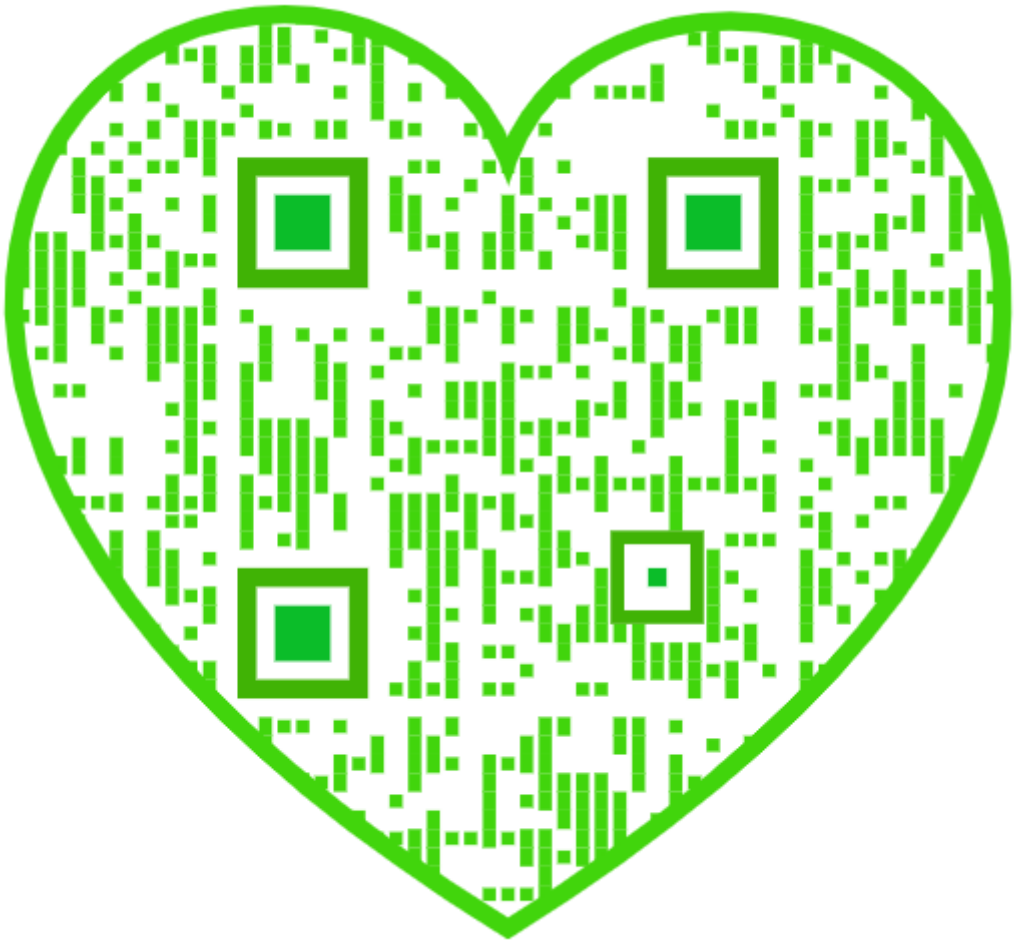

Issued from the United States Patent Office

FOR THE WEEK ENDING SEPTEMBER 15, 1857.

[*Reported officially for the Scientific American.*]

HULLING RICE—Wilson Ager, of Rhorsburg, Pa. : I claim removing the rice husk by pressure in direction of the length of the grain effected by the action of a shell and burr, dressed and operating substantially as set forth.

CLEANING RICE—Wilson Ager, of Rhorsburg, Pa. : I claim the method of cleansing rice by submitting the mixture of grain and husk resulting from the hulling process, to an alternate packing and loosening action, produced by surfaces dressed and operating substantially as set forth.

GRINDING MILL—Aaron Arnold, of Troy, N. Y. : I claim the combination of the rotating disk or plate, I, and cut or sectional cone, J, with the interior of the concave, G, and flange, F, for the purpose of feeding in to the mill, and grinding large substances, such as corn on the cob, and as set forth.

I also claim securing the cone and disk, or plate, I, to the shaft, through the intervention of the face plate. H, substantially as set forth, so that said cone and disk may at any time be removed and replaced by others when they become dull or worn away.

FLOUR BOLT—N. Bauman, of Elmore, Ill. : I am aware that beaters placed both parallel and spirally with their shaft have been used for similar purposes. I therefore do not claim said beaters separately.

But I claim the shell or case, B, carved or formed as shown, in combination with the rotating beaters, K, and frame, e, with bolting cloth, f, attached, the whole being arranged as shown, for the purpose set forth.

[This invention consists in the employment of a stationary shell or case, which is formed of metal or wood, and of a peculiar shape. It has a frame covered with bolting cloth fastened to one side. Within the case a rotating shaft is placed, having beaters attached, and the whole so arranged that the beaters rotating in conjunction with the form of the shell, will cause the flour and bran to be thoroughly separated.]

KNEADING DOUGH—Hiram Berdan, of New York City : I claim the employment in a kneading machine of a flopper, E, applied and operated in any manner, substantially as set forth.

[A flopper or rigid bar is so arranged that it is made to rotate through the dough and to mix the flour, water, and yeast, or other ferment, thoroughly together; after which it cuts the dough up in strips, and then re-unites it, all the while working it up and down, so as to afford a light and pleasant bread.]

HARDENING HAT BODIES—Joseph Booth, of Newark, N. J. : I claim a hardening machine operating substantially as set forth, and consisting substantially of a cradle and of a rapidly revolving spindle, upon which the cradle is supported eccentrically.

SUSTAINING WINDOW SASH—Edward T. Briggs, of Salem, Mass. : I claim furnishing the sash with the metal strip, g, in combination with the angular grooved support, b, and spring, c, in the manner and for the purpose set forth.

INDIA RUBBER PAINT—William & William A. Butcher, of Philadelphia, Pa. : I claim the composition prepared and composed of the materials as described, for the purpose of making water-proof paint.

GAS GENERATORS—John Butler, of Brooklyn, N. Y. : I am aware that a patent has been granted for the use of fused metals, by passing the products of the distillation of coal and other substances yielding carburetted hydrogen (gas) through said metals. I therefore disclaim the use of fused metals, fusible at a low state of temperature, for the purpose of passing the products of the destructive distillation of coal and other substances, through said metals.

Nor do I claim said metals for bringing distilled carbon-hydrous vapors in immediate contact with the surface of the same.

Nor do I claim fused metal for the purpose of floating the carbonaceous matter usually deposited in retorts.

I claim generating illuminating gas in a retort over the surface of melted lead, or other fusible metal, in the manner set forth.

EXCAVATORS—Ze Butt, of Lincolntown, N. C. : I claim the attaching the posts, G G′, in combination with the cross bar, p, resting upon the frame to the scoop itself by pivots or otherwise, for the purpose of bearing and supporting it whilst loading and regulating the depth it is to enter the ground, and for taking the strain of the chains and windlass.

Again, I claim as my invention the elevation of the loaded excavator by horse power, in the manner described, or any other method substantially the same.

I likewise claim the arrangement and combination of the gate catch rod and lever, so that the gate can be opened and closed by the driver without his leaving his seat, substantially as shown and described.

MASTIC ROOFING—Wm. H. Carver, of Covington, Ky., and J. Beckley, of Cincinnati, Ohio : We are aware that near all, if not all the ingredients, composing our cement have been used, and therefore do not wish to be understood as claiming any of them when taken separately, nor the whole of them when used together.

But we claim the precise manner employed of mixing and compounding the ingredients composing the cement, when combined with the proportions of ingredients, as specified by which process of mixing and compounding and combination of ingredients, and applying the cement to use, we are enabled to decompose or destroy the ammonia contained in the coal tar, to prevent it from destroying the cement and eating the canvas on which it is spread, and at the same time produce a cement that is not brittle and subject to cracking, but hard enough to resist forces that roofs are generally subject to, and at the same time elastic enough to expand and contract to suit all conditions of heat and cold, and make the cement water-proof.

MOWING MACHINES—A. H. Caryl, of Sandusky, Ohio : I claim the combination of the rear portion of the tongue or hounds, E E, with the main or wheel frame, A, and seat, G, said parts being arranged for joint operation, in the manner and for the purposes set forth.

RAKING ATTACHMENT FOR REAPERS—A. H. Caryl, of Sandusky, Ohio : I claim first, Raising the rake in the plane in which it is inclined by means of the devices described, for the purpose specified.

Second, I claim operating the raking attachment back and forth over the platform by means of the mechanism substantially as set forth.

Third, Inclining the rake from a vertical plane to correspond with the length of the grain being cut, by means of the devices described.

COOLERS FOR BREWERIES—Adolph Hammer, of Reading, Pa. : I claim the application thereto of the movable partitions, B B, rendered stationary in the manner substantially as described, and for the purpose set forth.

INVALID BEDS—George H. Clark, of Pontaic, Mich. : I claim the construction and arrangement of parts described, by which the head end of the foot portion of the bed is made capable of being lowered away from the patient, substantially as and for the purpose set forth.

I also claim combining with said arrangement the slide, M, attached to the frame to support the vessel, as set forth.

MAKING PAPER PULP FROM IVORY—William N. Clark, of Chester, Conn. : I claim the using of ivory as stock to make pulp for the manufacture of paper.

HANGING MILL STONES—Edwin Clark, of Lancaster, Pa. : I do not claim hanging the upper stone in a balanced rim or gimbal joint, as this has heretofore been done.

But I claim so uniting the rim which supports the upper stone to the frame of the mill by sliding blocks or followers as to allow an upward play or automatic adjustment of the upper stone, and at the same time admit the usual hand adjustment by set screws if desired, substantially as described.

SHIP'S PUMPS—Abraham Coates, of New York City, and Samuel M. Perry, of Brooklyn, N. Y. : We claim the peculiar mechanism by which we obtain reciprocating motion, between the pump and piston from each move of a lever, having a combined horizontal and longitudinal motion, the same consisting of the shaft, the cross, through which it passes, the universally moving lever attached by journals to the cross, at right angles to the shaft, and the two bevel gears or section of gears—the one attached to the lever, the other to the shaft—or any other arrangement substantially the same and for the purpose specified.

SOCKET FOR BOLTS—H. W. Collender, of New York City : I claim having a disk or follower, d, placed within the socket, and connected with a spring, E, arranged in any proper way, so that as the bolt, A, is withdrawn from the socket, the spring will press the disk or follower against the upper or outer end of the socket, and close the orifice thereof, for the purpose specified.

[The sockets of bolts often become so choked up with sand or dust that the bolt cannot be pushed in. This may be hindered by the above device, which consists in a light spring and plate in the socket, so that when the bolt is withdrawn, the plate is pushed up, and closes the orifice of the socket, thereby keeping it clean.]

EXPANDING SPECTACLE BOWS—George N. Cummings, of Hartford, Conn. : I claim the spectacle eye-former, made in two parts, as described, the circumference of the two parts when closed being smaller than the eye, and being expanded by the double former to the required size, in the manner and for the purpose as herein set forth.

STREET-SWEEPING MACHINES—John Critcherson, of Boston, Mass. : I claim the improvement in street-sweeping machines which consists in the combination of the adjustable sliding bars traveling in the arc of a circle with the universal joints for driving the diverging shafts upon which the brushes are arranged, whereby the sweeping apparatus is adapted to streets of various widths.

BRIDGES—Charles H. Earle, of Green Bay, Wis. : I do not claim making a bridge in sections.

Nor do I claim the attachment of sections of bridges to their abutments by knuckle joints or hinges, as I am aware that draw-bridges have been constructed with such attachments.

But I claim the supporting of those ends of the several sections, B B, of the bridge which are not connected directly with the abutments, by attaching them to cap pieces, c, or their equivalents, fitted to rise and descend on piers, in combination with the attachment of the sections next the abutments, with knuckles or hinges whereby the bridge is rendered self-adjusting, and prevented being carried away by accumulations of ice, floods, or other causes leading to lift the bridge from its place.

[These bridges are designed to supersede the ordinary ones in places where they are liable to be carried away by floods or ice accumulating round the piers, the whole of the bridge being capable of being lifted with the flood and again falling into its proper place without injury.]

OPERATING VALVES OF STEAM ENGINES—Robert H. Fletcher, of Brooklyn, N. Y. : I claim the arrangement of the slide valve, E, with the pistons P and K, and valves, Z and M, with their respective steam ways operating together in the manner and for the purposes described.

PAINTERS' EASELS—George Gillett, of Little York, N. Y. : I claim the combination of the three motions obtained by the two semi-circles and the rotary motion of the standard, together with the latches and notches in the semi-circles, to retain the position, and also as an application to the easel or painting stand.

SAFETY FUSE COMPOSITIONS—Edwin Gomez and Wm. Mills, of New York City : We claim the explosive compound for safety trains, fuses and similar purposes, formed of the ingredients and substantially as specified.

OPERATING WINDOW SASH—John C. Grant, of Salem, Mass. : I do not claim balancing the sash by means of a spring, as that is not new.

But I claim combining with the window frame and sash, the rack, a, gears, b b′, pulleys, c c′, and spring, d, all arranged and operating substantially as above set forth.

FEATHERING PADDLE WHEELS—Lewis T. Howard, of Smith's Mills, Miss. : I claim contracting the hub of the paddle wheel, so as to dispense with an outside bearing, for the purpose of enabling me to place the feathering wheel outside of the paddle wheel, and use any length of connecting arms between said feathering wheel and the buckets that may be deemed most effective, and as set forth and explained.

TREATING COTTON AND LINEN WASTE—Eben Norton Horsford, of Cambridge, Mass. : I do not claim the use of acid for the purpose of removing any of the mordants or native resinous or coloring matters from raw textile or fibrous materials.

But I claim the use of acid to dissolve metallic particles in cotton and linen factory waste, substantially as described.

TREATING FIBROUS AND TEXTILE SUBSTANCES—Julius A. Jillson, of Poughkeepsie, N. Y. and Henry Whinfield, of New York City : We claim the process of treating fibrous and textile substances in a permanent vacuum for extracting coloring, grease, or other foreign matters, substantially as set forth.

POINTING WIRE—C. Jillson, of Worcester, Mass. : I claim causing the wire that is being pointed to force the cutter away from the point that is being cut, but forcing it away, controlled by a pattern which regulates the form and the taper given to the wire, the whole being accomplished by means substantially such as herein set forth.

BELT TOOL—David A. J. Lamson, of Cherry Valley, Mass. : I do not claim broadly the combination of a number of implements together, so as to form a complex or universal tool, irrespective of the construction and arrangement of the parts forming such a tool.

But I claim the combination of the several tools specified in one instrument, when constructed and operating substantially as described.

VALVE GEAR FOR OSCILLATING STEAM ENGINES—John C. Pennington, of Paterson, N. J. : I claim a valve gear for an oscillating steam engine, composed of an eccentric set substantially as described, and a slotted arc, the curve in which is concave towards the shaft, and provided with a sliding pin, which is connected with the valve, or the equivalents thereof, and this I claim whether the slot be long enough for reversal, or of such length as may be sufficient for running the engine in one direction only.

SPOKE MACHINE—Samuel Lord, of Perry, Ga. : I do not claim, separately and apart from the arrangement shown, any of the parts described.

But I claim the vibrating frame H, operated as shown, and arranged with the carriage, B, and saw, C, specifically as described, so as to operate conjointly as and for the purpose set forth.

[This machine has the stuff which is to be cut centered in a vibrating frame, the axis of which is oblique, relatively with the stuff, and then by employing a traveling saw and other contrivances, the spokes are turned out direct from the stuff at one operation.]

HARNESS FOR LOOMS—George Matoon, of Chicopee Falls, Mass. : I do not claim making a harness with a knot at the top as well as one at the bottom of each eye thereof, as this has been done before. When the eye is knotted at the top and bottom there is double the friction and wear on the warps that takes place when the eye is knotted only either at top or bottom.

I claim the improved mode of making a harness so that its lease and knot shall be below its eye, and the threads of each loop be caused to pass against one side of their shaft or bar instead of being caused to embrace opposite sides of it, namely, first knitting the harness with a lease at top and one at bottom, or one above as well as one below each eye, and subsequently changing the upper shaft so as to pass it between the several loop threads of the upper side of the harness in such manner as to make both threads of each loop pass against one side of the shaft.

PREPARING TRACING MUSLIN—Jesse K. Park, of Marlborough, N. Y. : I claim the employment of the oil of the palma christi, or castor oil, alone or as an ingredient in the composition for increasing the transparency of tracing muslin, as specified.

REGULATING THE VELOCITY OF WIND-WHEELS—Francis Peabody, of Salem, Mass. : I claim as an improvement in regulating the action of wind-wheels, the sectional disk operating in the manner substantially as set forth.

TENONING MACHINE—Perry Putnam and John E. Crone, of Lowell, Mass. : We do not claim the parts of our machine separately.

But I claim their arrangement and operation specifically as shown, for the purposes set forth.

WATCHMAKER'S LATHE—Roswell H. St. John, of Bellefontaine, Ohio : I claim the construction of the chuck formed of the jamb disk, d d, the tubular clutch collar or ward brush, e e, with the centering plate, i i, and adjustable jaws, J K L, together and combined with a keying mandrel, a 2 b c, substantially as shown and described.

PRESERVING ALKALIES—George Thompson, of East Tarentum, Pa. : I claim the use of metallic boxes, constructed as described, and united with infusible cement, for the purpose of putting up the caustic alkalies of soda and potassa in small quantities, as described.

DRIP POTS FOR SUGAR-HOUSES—John Turl, of New York City : I claim constructing the pot of two metal parts or halves, A A, formed or "struck up" in proper shape by any proper means, and connected together by rivets, a, by brazing, or in any suitable way, substantially as described.

[The ordinary drip pots in a sugar-house are either earthenware or cast and sheet iron combined. The former have to be made very heavy, to prevent breakage, and even then they are liable to fracture, and the others are liable to leak, from the diversity of their halves. The subject of this patent is, however, made in two halves of sheet metal, and brazed together, thus securing lightness and durability.]

ILLUMINATING GAS APPARATUS—Charles B. Warring, of Poughkeepsie, N. Y. : I claim first, The eye-piece and tube in combination, substantially as described.

Second, I claim the peculiar apparatus described, for conveying the gas into the gas holder.

BALL CARTRIDGES—Lemuel Wells, of Astoria, N. Y. : I claim the attachment of a hard metal shell of a ball cartridge to the bullet, substantially as described, by making it smaller than the bullet, and driving it into a cavity in the rear of the bullet.

[This invention consists in making the shell of the cartridge of metal tube, fitting into a seat, and swaged or otherwise to receive the bullet.]

DIAPHRAGMS FOR PHOTOGRAPHIC CAMERAS—J. R. Werner, of New York City : I claim the application of an elastic diaphragm in photographic cameras for the purpose and in the manner specified.

BREWERS' COOLERS—Adam Wood, of Pittsburg, Pa. : I do not claim in the abstract, or separately considered, the corrugated sheet metal bottoms, viewed only as a means to compensate for the expansion and contraction of the metal, for this is a well-known mode of obviating this difficulty, and is employed in metal plates for roofing and other purposes.

Neither do I claim the cooling of the liquor by means of cold water tubes with which the liquor is brought in contact, irrespective of the arrangement shown, for such means have been previously employed.

But I claim constructing the coolers in two parts, A B, corrugated and placed in contact as shown, so that cold water or air passages, e f, are found between said bottoms, and the bottoms allowed to expand and contract freely without injury, by which the bottom of the liquor within the cooler may be cooled as quickly as the top, or the heat rapidly absorbed from both surfaces, and the cooling of the whole mass or quantity therefore greatly expedited.

[Malt liquor has to be cooled very quickly after the hops have been boiled with it, or it would become acid, and be rendered useless. This cooling has usually been effected by pouring the liquor into large, shallow wooden vessels, but even though this process was very quick, acidification often set in before the whole was cooled. The inventor of these coolers obviates this by having a double bottom of corrugated iron to the cooler through which cold water is continually running.]

RAKING ATTACHMENT FOR REAPING MACHINES—Christian Yost, of Leacock, Pa. : I claim operating the rake, A, by means of the device, D, the regulator, C, in combination with the semi-cog wheels, K L, and pins, N N, arranged and connected substantially as set forth

TYPE SETTING AND DISTRIBUTING MACHINE—Timothy Alden, of New York City : I claim, first, The method substantially as described for conveying the type to and from the type cases, and the composing and setting tables, consisting of a type carrier in combination with a series of conveyors, which are capable of receiving any type indiscriminately, and also of receiving an indication representing the type so received, or that required, whereby that type may be deposited into or taken from the type cases, substantially as set forth.

Second, The described or any equivalent method of attaching the conveyors to the carrier, by which they are permitted to stop while delivering or receiving type without arresting the motion of said carrier, substantially as set forth.

Third, Giving to the conveyor or vibratory or tilting motion upon its central pin, whereby its gripping end is made to closely approach the place at which the conveyor is to receive or deposit a type for the purposes, and in the manner substantially as described.

Fourth, In combination with the devices or mechanism for receiving and for delivering the types into and from the type cases as described, or their equivalents, I claim arranging the types edgewise in said cases, whereby, for all the types of a font, an uniform throw or action may be given to said mechanism.

Fifth, In combination with the type channels, the mechanism for pushing out the type, consisting of the rack, pendulum lever, and propelling rod, and the pusher upon the conveyors, or any equivalents thereof as described.

Sixth, In combination with the type channels, the mechanism for preventing the stopping of a setting conveyer at a type channel when it is empty, or a distributing conveyor at a channel when full of type, consisting of the tilting bar, S 7, the pendulum lever and rack or equivalents as described.

Seventh, The method of discharging the type from a distributing conveyor into the type channels, or of causing it to be received from such channel into a setting conveyor, consisting of the cam, d 6, and the pusher plate, b 6, or equivalents thereof as described.

Eighth, The mechanism for setting the gripping bolt upon the conveyors, and for releasing the same, consisting of the stationary cam, u 5, and crank lever, f 5, for the setting of said bolt, and for the releasing thereof, of the latch, v 5, and cam or pin, y 6, as described.

Ninth, The method substantially as described of effecting or ensuring the deposit of each type into or the taking thereof from an appropriate case, consisting of the excavated ring, m 5, or any equivalent thereof which shall have upon it at or near each type case, a device indicative of the denomination of the type contained in said case, and which device shall cause, at the proper place, an action of the conveyor, to receive or to deposit a type, as the case may be, in accordance with any given set upon the conveyor, as set forth.

Tenth, The stationary inclined pieces, g 7, in combination with the grooves of the ring, m 5, for restoring the indicating points upon the conveyor to a zero or starting point as described.

Eleventh, The movable indicators, e 7, or their equivalents, in combination with the grooves in the ring, m 5, and with the shifting bars of the distributing mechanism, as described.

Twelfth, The method of setting the distributing indicators by means of the system of levers, Z 3, or equivalent mechanism, so constructed and operated as to be acted upon by a system of nicks upon the type, by which certain parts are allowed to be brought into operation to move the indicators, in accordance with the plan or combination of nicks, and whereby the appropriate case or place of deposit of type is indicated upon the conveyors as described.

Thirteenth, The graduated stop, c 4, in combination with the indicating levers, Z 3, for regulating the feed of the line of type, as described, and also in combination therewith the mechanism described under e 4, i 4, and l 4, for restoring said levers into position when about to return for a new setting, and for setting the frame, y 3, against its guide plate, as described.

Fourteenth, The arrangement of mechanism for transmitting the movements produced upon the levers, Z 3, by the nicks in the type, and for effecting the proper combinations upon the indicators, e 7, consisting of the detaining levers, n 4, the bars, p 4, bar, t 4, bars, v 4, bar, y 4, and the connecting levers, g 4, together with the operating cams upon the shaft, j 4, or any equivalent combination, whereby the same results will be produced, as described.

Fifteenth, The mechanism for feeding up the column of type, and for elevating the successive lines thereof into the channel or equivalent devices as described.

Sixteenth, The method of engaging and disengaging the feeding pawls, consisting of hanging lever, a 3, in combination with the frame, X, with the means for depressing the bolt, d 3, and with the ratchet having the engaging and disengaging wedges as described.

Seventeenth, I claim, in combination with the keys, the arrangement of mechanism, whereby the separate different signals represented by each of a great number of keys may be produced by a less number of indicators as described.

Eighteenth, The radially revolving registering levers, in combination with the register wheel, and with the keys as described, or the equivalents thereof.

Nineteenth, The independent registering apparatus constructed as described, or its equivalent apparatus, which will effect the recording of the letters or signs, as indicated by the keys, independently of the type carrying apparatus substantially as set forth.

Twentieth, The mechanism for transmitting the indications from the register, consisting of the detaining levers, K, o, or equivalents, in combination with the setting indicators, and with the register, as described.

Twenty-first, So combining the register and the setting indicators, f °, with the type carrier that the latter shall effect the movements of the register, to set the indicators in time to act upon the setting conveyors, and immediately thereafter, effect the retreat of the said indicators previous to the passage of a distributing conveyor as described.

REEFING AND FURLING SAILS—G. W. La Baw, of Jersey City, N. J., assignor to himself and Chas. A. Durgin, of New York City : I do not limit myself to any particular mechanism for operating the vertical rollers around which the sails wind, as such mechanism may be varied.

I claim the arrangement of vertical rollers in front or rear of the mast, and operated by mechanism from the deck of the vessel, and whereby I am enabled to operate separately or together the sails on each mast from the deck, substantially as described and set forth, irrespective of the mechanism employed for working the vertical rollers.

SAW FILER—J. J. Near, of Oneida, N. Y., assignor to Eli Near and Levi Vandusen, of Madison county, N. Y. : I claim a clamp to gripe the saw, substantially as described, and carrying hinged vibrating arms provided with springs for holding and operating the file, substantially in the manner described.

ARRANGEME T OF PASSAGES AND MEANS FOR WORKING STEAM VALVES BY THE DIRECT ACTION OF STEAM—Barnabus Ruberts and Alex. Crumbie (assignors to themselves and John Benson), of Brooklyn, N. Y. : We are aware that the valves of steam engines actuated by steam pressure applied to pistons other than the main working pistons have been used, and therefore we disclaim such use. We are also aware of the patent of Norman W. Wheeler, July 31, 1853, and we therefore claim no part, device, or thing patented to him.

But we claim the arrangement of the steam channels, a, b, c, which are opened and closed by the travel of the main piston, connecting the steam chest and cylinder as described, in combination with the pistons, J J, of equal areas or their equivalents, substantially as described and set forth.

CONTROLLING COG GEAR SASH BALANCE—John MacMurtry, of Lexington, Ky., assignor to Danl. Wiehl, of Fayette county, Ky. : I claim arranging the cog gears, F H, of the lower sash C′, on the shaft, G′, which is capable of turning vertically, and sliding horizontally, and which has arranged on its back end a locking plate, I, which slides with it, but which cannot turn with it, said plate having a bar or cog, f, on its edge, which serves as a stop to hold both or either of the sashes in any desired position when geared together or separated, substantially as and for the purposes set forth.

BRICK MACHINES—G. J. Washburn, (assignor to himself and Anson L. Hobart,) of Worcester, Mass. ; I claim the combination of the molds, E, of the frame, A, and hopper, D, constructed, arranged and operated together, substantially in the manner and for the purpose described.

IMPROVED BOOT AND SHOE SOLE CUTTER—Parker Wells, of Middletown, Mass., assignor to Saml. Mower, of Boston, Mass. : I claim the combination of a cutter or cutters with a yielding slide, substantially as set forth for the purpose specified.

LOCKS—H. W. Covert, of Roxbury, N. Y. : I claim the combination of the disks, D D, with the cones, cylinders or disks, V V, in the manner and for the purpose substantially as described.

MANUFACTURING SHINGLES—J. E. Young, of Augusta, Me. ; I claim vibrating the shingle bolt about an axis lying in or near the plane of the cut, and equally distant from each end of the bolt.

Second, I claim the sliding rod, K, and wedges O, constructed and operating in the manner substantially as set forth.

RE-ISSUES.

ELASTIC GORE CLOTH—Chas. Winslow, of Lynn, Mass. Patented Aug. 4, 1857 : I am aware that an elastic cloth has been made as a shirred fabric. This, how-

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ever, differs essentially from the "elastic gore cloth," made in accordance with my invention, as the edge of the former is turned over parallel to the warp.

I do not claim the peculiar elastic cloth as made with its filling arranged at an acute angle with its warp; nor do I claim the elastic as made of two layers of such cloth combined.

But I claim as an improved manufacture an elastic band or gore cloth, when made not only of a fabric composed of a cement of India rubber or gutta percha and two pieces of cloth, in which the warp and weft of each piece are made to cross one another diagonally or at acute angles, but with the edges of the cloth cut and overlapped, and cemented down in a line or lines out of parallelism with either the warp or weft threads; the line of maximum elasticity in the binding, making that angle with the warp as well as the weft, which is the compliment of half the angle which they make with each other.

ABDOMINAL SUPPORTER—Julia M. Milligan, of New Albany, Ind. Patented Feb. 10, 1857: I claim the bandage, a, substantially as described, provided with a series of cords, g, and laces, b, or their equivalent, applied and operated substantially in the manner and for the purposes set forth.

LOOMS—Wm. V. Gee, of New Haven, Conn., assignor to The Atwater and Bristol Manufacturing Company, assignors to The Nashwannock Manufacturing Company, of East Hampton, Mass. Patented Feb. 27, 1855: I wish it to be distinctly understood that I do not limit myself to the special construction of parts, or their arrangement, as these may be greatly varied by the substitution of mechanical equivalents.

But I claim the privilege of varying them, so long as I attain the same ends by substantially the same means.

I claim, first, Mounting a loom with two distinct sets of harness, each governing all the warp threads, for the weaving of a web on one side of an intended button hole or slit, and capable of being thrown out of action each by itself while the other set is in action, during the process of weaving button holes, substantially in the manner and for the purposes before specified.

Second, I claim connecting each set of harness capable of being thrown in and out of action, and governing all the warp threads on either side as described, with a bar or slide govered by a cam or catch or the equivalents thereof, to throw one or the other of the said sets of harness out of action when necessary, substantially as described.

Third, I claim the combination of the mechanism before described for causing one set of harness to cease its action, or any equivalent therefor, with another mechanism substantially such as is before described for determining the period during which one set of harness shall remain out of action or lay dormant, or the time or moment at which such harness shall cease to act or any equivalent therefor; the combination acting substantially as and for the purposes set forth.

Fourth, I claim the combination of a slow moving cam, or cams, or its or their equivalents, for determining the time and period or time or period during which a set of harness shall be out of action as before set forth, with harness substantially such as is before described, mounted in sets, each set governing all the warp threads on one side of a button hole, so that different sets of harness may be in action or laying dormant at proper times and for proper periods, for purposes substantially such as are described.

Fifth, I claim a contrivance substantially such as is specified for throwing the take-up motion out of gear or any equivalent therefor, for stopping the take-up, in combination with two sets of harness, each governing warp threads, substantially in the manner and for the purpose described.

And lastly, I claim the combination of a slow moving cam, substantially such as is specified, or any equivalent therefor, with a mechanism for stopping or starting a take-up motion, substantially as described, or any equivalent therefor, whereby the time and period, or time or period of the stoppage or cessation, from action of a take-up motion may be determined automatically for the purposes substantially as set forth.

STENCILING WINDOW SHADES—Daniel Lloyd, (assignor to G. L. Kelty and D. M. Ferguson,) of New York City. Patented Jan. 29, 1856: I claim first, Producing patterns on window shades in which long or continuous lines form a prominent feature, by means of a pair or pairs of stencils of the full size of the design, prepared substantially in the manner set forth.

Second, The mode of registering the stencils by the use of the plates, E, and pins, C, for the purpose of adjusting and readily adapting the stencil to shades, as specified.

COATING WATER PIPES—Jonathan Ball, of Elmira, N. Y. Patented December 15, 1843: I claim lining metallic pipes with hydraulic cement, by means of a cone, or its equivalent, guided through the pipe so as to lay on the cement of equal thickness, and with great certainty and economy, substantially as described.

[For the Scientific American.]

The Aquarium or Aqua-Vivarium.

We have requested the gentleman whose name appears at the end of this description to write it for us, believing that it will prove of interest to our readers:—

I will commence by giving a brief account of the history and theory of the Aquarium. The first hint on this subject is found in a book published at Leyden, in 1778, wherein it is stated that plants immersed in water, and exposed to the action of light, emit oxygen gas. In 1833, a Mr. Danbury, and in 1837 a Mr. Ward, again promulgated the practicability of supporting animal life by oxygen furnished by vegetable growth. In 1852, a Mr. Warrington and a Mr. Gorse almost simultaneously made experiments, which have resulted in the successful sustenance of animal life in connection with vegetable existence.

The Aquarium, or Aqua Vivarium, is founded upon the principle that aquatic plants, while growing, emit sufficient oxygen gas for the support of animal life to a limited extent; the plants, in their turn, forming their solid structure by means of the carbonic acid thrown off by the animals in the process of breathing. This is the theory; the application is as follows:—A clean, tight vessel, with glass sides, is employed for a tank. The bottom is first covered an inch deep with clean, coarse sand, upon which I have found it best to put a thin covering of dark gravel. A rude rock-work adds much to the beauty of the tank and to the comfort of its inhabitants. Over the surface there should be scattered a few aquatic plants—if marine, attached to stones or shells; if fresh water, having their roots buried in the sand; and water is then added, and the whole left for a week or more, until the plants are acclimatized and are growing nicely. When thus ready, the "stock" may be added by degrees, until the proper balance of animal and vegetable life is effected. In both marine and fresh water *Aquaria*, a mucous or fungous growth is soon developed, which may be kept down by pond snails, or by the buccinum or salt water snail.

My first attempt was with gold fish (*Cyprinus*); but not being able to obtain the proper plants, I stocked a confectioner's glass jar with a few other plants from the sea, and there soon appeared a large number of small animals, which, viewed by lamp-light, were very interesting. I have found that very deep and narrow tanks, of various shapes, have not succeeded so well as those having a much greater breadth than depth. The tank which I successfully stocked was of an octagonal form, of thirty inches in diameter and about eight in depth. Excepting the great difficulty of rendering it tight, this tank has succeeded admirably. After being in use for a long time, the rock-work is still covered with vegetation, and crabs, minnows, eels and mollusca still sport and wrangle in the home which they have so long occupied.

The animals which I have found to thrive most easily, and to accommodate themselves most readily to their new home, are the minnows or killy fish, the stickleback (*Gasterosteus trachurus*), the shrimp, small specimens of lobsters, hermit crabs, serpulidans, small common crabs, eels, and star-fishes. I have been told that the small sheeps-head (*Sargus ovis*) is also very good. The patella, the buccinum or sea-snail, the purpara or whelk, and several varieties of crepidulas, have also succeeded nicely. The scallop, one of the most beautiful of animals, whose iridescent hues are marvelous in their brilliancy, I have not been able to keep for any length of time. The barnacle, also so interesting in its mode of breathing and of catching its prey, has not lived long. The spider crab, which the ancients held emblematic of wisdom, and which is noted for his fondness of dress and mischief, has been found altogether too reckless of the consequences of his pranks, and has been banished to a tank kept for "unruly offenders." No animal in a tank, however, has behaved with more propriety and been productive of more amusement than the small species of hermit or soldier crab. They are ever active, and constantly ready to change their shells for their own gratification or that of beholders. They seldom pass each other without disputing the right of way, and yet never injure each other at all. A little incident will show the pleasure that may be found in observing them. While watching my tank, I saw a hermit crab cogitating upon the expediency of vacating his shell for an empty one lying near him. After mature deliberation, he concluded upon the exchange, and suddenly popping his tail into the vacant shell, he crowded out a cloud of particles, probably of decayed animal matter; this attracted the attention of a shoal of minnows, which immediately attacked the poor hermit, endeavoring to draw him from his shell. But a new claimant immediately appeared in the person of a common crab, who clasped the hermit in his claws and attempted to carry him off by "force of arms." The minnows, unwilling to be thus defrauded, now beset the robber, while the hermit, taking advantage of this diversion, crept quickly away from the scene of strife; doubtless convinced that "there is no place like home."

Prawns and shrimps are also objects worthy of admiration. No bird sails through the air with more gentleness than these fish float through the water. Star-fishes, likewise, are very pleasing; they live long in confinement, but are, however, quite greedy, and the larger ones will soon destroy a stock of buccinums. The small sheeps-head is said by those who have kept it to be very hardy. Many other aquatic animals will doubtless be found to be as suitable as those already named.

The study (for *study* it is) of Aquaria is but yet in its infancy in this country; and we may reasonably hope that when those who are close observers of Nature become interested in this matter, we shall learn much more of the "private life" of the inhabitants of the ocean than we have ever hitherto known. Probably no such facilities for the study of natural history have ever been offered as are now presented by the Aquarium. We have in our rooms, where we may examine it at our leisure, a sort of section of the ocean, whose inhabitants may be examined in their natural abode, and under most favorable circumstances. With such facilities it will be easy to learn more in a few months' observation than we have heretofore been able to learn by years of examination of dead or dying specimens.

Tanks may be made of various forms. The simplest are made of confectioners' jars or any open-mouthed glass vessels. These will answer very well for small specimens; but the best kind, most proper for the fish, and well suited for observation, are those made in a rectangular form, with four glass sides. It has been found very difficult to make these permanently tight, and at the same time free from the taint of cement. This has, however, been remedied, I believe, by some of the dealers in tanks, so that they may now be purchased so constructed as to be put into use without fear of leakage.

In a fresh water tank we have no anemones nor hermit crabs; but we have newts, the stickleback which builds its nest beneath the waters, the water-beetles, the tadpoles, and numberless others, which fully compensate for the absence of those that are found only in sea-water.

The speedy popularity of this piscatorial and botanical "institution"—the Aquarium—is undoubted. All that is needed is to exercise patient perseverance, regular attention, and, above all, perfect cleanliness. No decayed matter, animal or vegetable, must be permitted in the tank. A strict care to not overstock or crowd the animals, and a determination to overcome obstacles, will insure success; and the Aquarium will become—what it has already become to thousands in Europe—a "new pleasure."

CHAS. E. HAMMETT, JR.

Newport, R. I., Sept. 21, 1857.

[At the polite invitation of our correspondent, we were permitted, while spending some time at Newport this summer, to examine the specimens to which he alludes; and we have seldom spent an hour more pleasantly. Those who may feel a desire to behold the wonders of the deep, in miniature, are referred to the Aquarium of our correspondent, or to Barnum's Museum, in this city, where some good specimens are on exhibition. Mr. Hammett's modesty forbids his intimating in the above article that he is prepared to furnish Aquaria tanks of superior construction (an improvement of his own) to such persons as may desire to try their skill in raising the pisces, molluscs, and articulates of the mighty ocean, and to derive instruction from observing the life and habits of those curious creatures.—ED.

The Teeth and the Beard.

MESSRS. EDITORS—The remarks of "Dentist" on "the best means of securing a healthy denture" have induced me to suggest whether wearing the beard might not promote that desirable result? Hair is among the best non-conductors; and to deprive the face of that natural protection to the delicate nerves of the maxillary region, must, it seems to me, expose the teeth to the deleterious action of atmospheric vicissitude. S. Y. A. L.

[We think that the growth or want of beard can only affect the teeth by protecting them or otherwise from external cold, as the teeth are formed and grow from the jaw which is separate and distinct from the surface of the skin, in which are the juices that afford nutriment to the hair. We know many persons having naturally excellent teeth, who are very far from hirsute, and also persons with large fine beards and very bad teeth; so it does not seem as if there was any connection between the two.

Aluminum.

A new method of making this metal has recently been patented in England by F. W. Gerhard. It consists in placing fluoride of aluminum in an iron oven, which may be heated in various ways. This oven is first strongly heated, and on the floor thereof is placed a number of shallow dishes. A number of these dishes are filled with dry and well powdered fluoride of aluminum, and the remainder with iron filings. They are so arranged that all of those dishes which contain the fluoride are on all sides surrounded by dishes containing the iron filings. The oven is then closed and luted, and the heat increased to redness, after which a stream of dry hydrogen gas is introduced. The effect produced is, that the hydrogen gas combines with the fluorine, and forms hydrofluoric acid, which acid is taken up by the iron, and is thereby converted into fluoride of iron, whilst the resulting aluminum remains in the metallic state in the bottom of the trays containing the fluoride.

The Electric Telegraph.

The first overhead telegraph in London has just been successfully put up by an enterprising firm in that city, to connect their two places of business. The distance between the two establishments is about one-third of a mile, and the whole space is traversed by a single wire, suspended from pole to pole, at a great elevation above the intermediate houses. It is understood that another will shortly be erected by the authorities, to connect the police courts, the police stations, and the fire brigade stations throughout the metropolis, by an economical system of overhead telegraph, devoting one wire to detective police purposes, and one to fire purposes. The telegraph has been used for all these purposes in this country for some time. Uncle John is, therefore, behind Uncle Sam by some years in the domestic adaptation of electricity.

Bronze Powder.

The London *Builder* says that Herr Konig has made a series of experiments to ascertain the method of preparing this substance, hitherto a secret. From the result, it appears that the several varieties of bronze powdered leaf are each composed of nearly the same proportions of copper, zinc, and tin, and that the variation of color is owing to different degrees of oxydation, which have been produced by heating the alloy at different temperatures.

Salt.

An improvement in the manufacture of rock and sea salt has been patented in England, which consists in fusing the raw salt, and keeping it for some time in a state of tranquil fusion, decanting it into hot molds, or letting it cool slowly; in this manner all the impurities are separated from the mass in fusion, and are eliminated by crystallization by the dry process, which corresponds with crystallization by the wet one.

Tin Plates.

Tin plates—that is, tin plates of iron dipped into molten tin, which covers the iron completely—are manufactured in South Wales and Staffordshire, to the extent now of about 900,000 boxes annually, equal to 56,000 tuns, and valued at over five millions of dollars. In England, almost every article of tinware is formed from these plates. Nearly two-thirds of the total manufacture are exported, principally from Liverpool to the United States

Telegraph in Brazil.

A proposition has been made to the Brazilian government for the construction of a submarine telegraph from Pernambuco to San Pedro de Sul, communicating with various intermediate places along the coast.

The longest railroad in the world is the Grand Trunk of Canada, 856 miles of which are open. When finished it will be 1,112 miles

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New Inventions.

How to Make Tea Properly.

The proper way to make a cup of good tea is a matter of some importance. The plan which I have practised twelve months is this: The tea-pot is at once filled up with boiling water, then the tea is put into the pot, and is allowed to stand for five minutes before it is used; the leaves gradually absorb the water, and as gradually sink to the bottom; the result is that the leaves are not scalded as they are when boiling water is poured over them, and you get all the true flavor of the tea. In truth much less tea is required in this way than under the old and common practice.—*Exchange.*

Galvanized Iron.

Iron is "galvanized" by the following process, which is a purely metallurgic operation, and has no connection with galvanism, as the name would imply: it simply means iron covered with zinc. The zinc is kept melted in an iron pan, and covered with sal ammoniac. The iron, after having been thoroughly cleansed by means of dilute acid and friction, is immersed into the bath of melted zinc, and stirred about until the surface has received a coating of that metal. When cool, it is nearly white, and may be exposed to the action of the air or water without fear of rusting. It is becoming almost universal in its application, and is very suitable for the roofing of warehouses and rough shanties on wharves.

How to obtain the True Meridian, or Twelve O'Clock Mark.

On a smooth, level surface, draw several concentric circles. In the center erect a perpendicular, three or four inches high. Any time in the forenoon when the end of the shadow touches any one of the circles, mark the place; in the afternoon when the shadow touches the same circle, make another mark—then draw a line from these points thus obtained; at right angles with this line, draw a line to the center, which will be the true meridian.

As the sun is on the meridian at 12 o'clock only four times a year, viz., April 15, June 15, Sept. 1, and Dec. 24, it will be necessary to add or subtract as the sun is either fast or slow in coming to the noon-mark. In this manner the true time may be obtained almost to the second. A table (this table may also be found in the *American Almanac* and most probably some others) for this purpose, and sufficiently correct for all practical use, may be found in the *Family Christian Almanac*, published by the American Tract Society.

Many persons think that a north and south line traced by a surveyor's compass is a true meridian, but this is a mistake, for a line found as above indicated will vary from one given by the compass. That this line is correct may be demonstrated thus:—when a perpendicular four inches high casts a shadow six inches long, the sun being on the east side of the meridian, and when on the west side it casts a shadow the same length, midway between the two extremes will be the true meridian.

C. F. W.

Ashwood, Tenn., Sept., 1857.

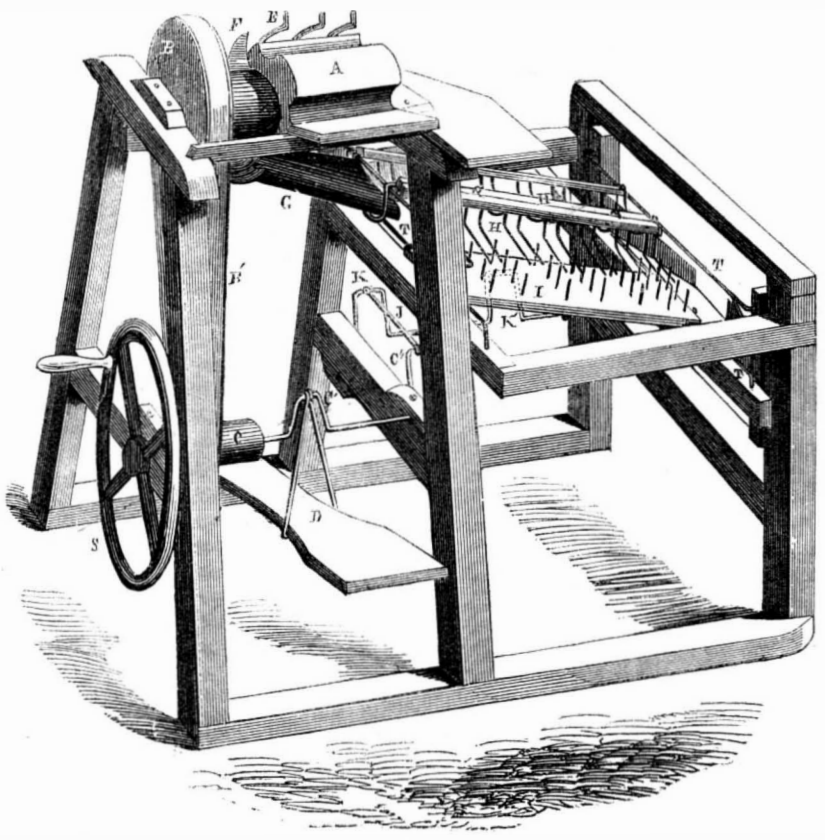
Improved Corn Husker.

In countries like this, where Indian corn is one of our staple commodities, any apparatus or improvement on former apparatus designed to facilitate the preparation of it for the market must necessarily be valuable, and a knowledge of this fact has caused much inventive genius and adaptive faculty to be expended on a few machines of the same class as that shown in our engraving. Yet there are comparatively few corn huskers, and in most places corn husking is yet done by hand.

The accompanying engraving gives a perspective view of the whole machine. D is a treddle, by which motion is given to the machine, or it can be done by the balance wheel, S. The motion is received by a crank, C′, and a driving pulley, C, and by means of the belt, B′, it is conveyed to B, on whose axle is fixed the deeply grooved cylinder, A. F is a concave knife, and E are spring wires. G is a trough, which carries the corn on to the platform, I, over the whole of whose surface short stout teeth are placed. This platform is moved backwards and forwards under the rake, H, (which also moves up and down) on the guides, T, and both platform and rake obtain their opposite motion from the cranks, C″ J and K K′.

The operation is as follows:—The corn is

BACHMAN'S CORN HUSKER.

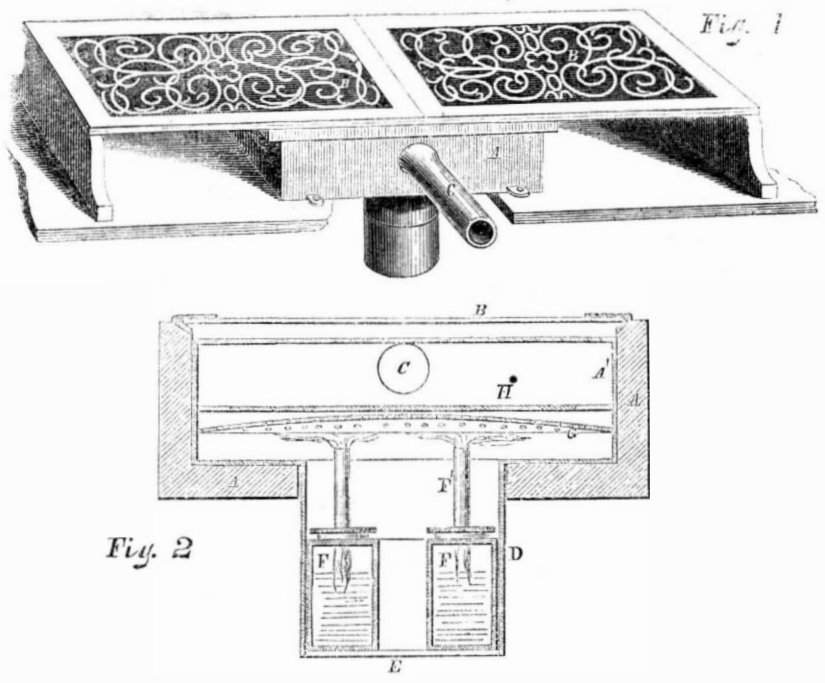


placed in the groove of A, with the butt towards the knife, F, and projecting just sufficient to be cut off; it is held in its place by the springs, E. It then passes into G, which delivers it on the platform, I, where the husk is torn off by the combined action of the sharp rake teeth and the motions of the platform and rake, and the corn turned out ready for shelling.

This is a simple and seemingly effective machine, which is not very liable to get out of order, but should it do so, its parts are easily accessible for repair. It may be mounted in a frame of wood or iron, as may be most convenient. Patented July 14th, this year.

For further information and particulars, apply to G. W. Bachman, the inventor and patentee, Clifton Springs, N. Y.

LEFFERTS' CARRIAGE STOVE.



John W. Lefferts, of Brooklyn, N. Y., is the inventor of the simple means here represented for providing a source of heat, by which the feet may be warmed in sleighs or other vehicles. This stove, as it may be very properly termed, is inserted in the bottom of the vehicle, a principal portion being below the ordinary floor. Fig. 1 is a perspective view, and Fig. 2 a vertical section.

A represents a case, which may be of wood. B is an iron grate, which may be either plain or ornamental. C is what may be termed a a smoke flue, to convey away the products of combustion. D is a bottom box, or casing of metal, which projects through the floor. E is a bar or adjustable stop, extending across the bottom of D. F are annular vessels, which serve as lamps, and will contain a sufficient quantity of alcohol to support the combustion for the length of journey desired. F′ are wick tubes, and G a perforated plate, which is mounted above, to distribute the heated gas rising from the lamp. H is a circular plate mounted above G, and which is continuous at its central portion, but has large apertures near its periphery, so that the heated gases ascending through the perforations in G are compelled to spread themselves over the whole surface of the stove before they can rise through H. It will be observed that there is still another plate entirely continuous, extending quite across beneath the grate, B, and which prevents the possibility of any flame or extremely heated gas rising to that level, and ensures a just sufficiently intense radiant heat rising through B to warm the feet placed thereon.

The demand for such a device is very severely felt, especially by those in whom the circulation of blood is feeble, and by those who start on long or cold journeys inadequately dressed. Many cumbrous and troublesome expedients are now resorted to, in the shape of heated bricks, and the like, to supply an evanescent heat. This device provides for an an almost unlimited supply, if necessary, and whatever the quantity of heat the lamp is prepared to furnish, will remain continuous throughout the journey, or until the fuel is exhausted.

For further particulars address J. W. Lefferts, 120 Sands street, Brooklyn, N. Y., or 194 Bleecker street, this city.

Useful Information about Boilers.

Messrs. Editors.—We run our works with a high pressure steam engine; the water is supplied by a well. For years the boiler remained clean inside—no incrustations whatever. A while since we made a change in our mode of heating the water to be pumped into the boiler, and caused the escape pipe to open into the heater instead of passing through it, as before. In a few months we found the boiler-plates were giving away over the fire. On examining the boiler, we found that the oil from the valve chest and cylinder which had passed through the exhaust pipe into the heater, thence into the boiler, had formed a black carbonaceous crust upon the bottom of the boiler in spots, to the thickness of three-eighths of an inch or more—one spot being just where the boiler gave way. Upon throwing a piece of this scale on hot coals it burned with a smoky flame, and with the odor of fresh pork being fried. The oil we were using was lard oil. We immediately altered our heater, and the boiler is as clean as before. I write this for the benefit of others similarly situated, and to prevent accidents.

M. C. Burleigh.

Great Falls, N. H., 1857.

[The above communication was received during the summer, and by accident mislaid. We now publish it with pleasure, as it contains information which will be valuable to many.—Eds.

The Money Panic.

Owing to the difficulty experienced by persons residing in many parts of the country in obtaining bills of exchange on New York, the usual enthusiasm in regard to competing for our annual prizes does not seem to be evinced this year. There was never a better time than the present for our friends to strive to earn a prize of three hundred dollars, or smaller sums, according to individual industry and perseverance; and from the foreshadows of coming events, we predict it will be found that there has not often been a winter in which one or two hundred dollars would have done a person in moderate circumstances more good than in the approaching one. It is an easy matter for almost any one to obtain fifty or more subscribers to the Scientific American, at $1 40 per annum each; and last year one of the prizes was awarded to a person who had procured only about that number.

Remember, reader, that *Fifteen Hundred Dollars* will be distributed, on the 1st of January next, to those industrious competitors who may have sent us the fifteen largest lists of subscribers. The hard cash to pay these prizes is already in bank, and no matter how bad the times may become, we intend to be sure in making our promises good, as we have heretofore done.

For inducements to clubs and for list of prizes, see the last page.

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Scientific American.

NEW YORK, SEPTEMBER 26, 1857.

Poison and Adulteration.

Happily for us, the day has gone by when human life was of so little value that poisoners were to be found in all classes or ranks of society, and their deeds of villany were done in the open day without the smallest fear of detection. In the olden time, if one person wished another out of the way, all he had to do was to signify his wish to some one of the numerous learned villains, who would do it for a consideration. Chairs, clothing, food, beverages, all were capable of being poisoned, and persons knowing of no other means used to wear amulets and charms to protect them from the effects of the poisoner's art. This refined method of murder had become a study, and was practiced as an art, as we know from the notorious examples of Brinvilliers and Borgia. We say, happily these days have passed away, for the light of pure and glorious science has broken in upon us, and now, as sure as the most subtle poison is administered, either by the microscopist's minute vision or the chemist's magic test, will that same poison again be brought to light, and made to confront the poisoner face to face. As a natural consequence, direct and intentional poisoning has diminished, but indirect and unintentional poisoning has increased, and all from the want of a little more knowledge generally diffused. Take an example: not long ago in Scotland, a party sat down to dinner and ate some horse-radish, as they thought, and all died in the greatest agony, for they had eaten aconite, a most deadly poison, instead. Now these two plants are much alike, and surely we ought to learn their distinctive features, that we may know for ourselves, and not trust our lives to an ignorant cook.

There are so many substances nearly alike—the one a deadly poison, the other perfectly harmless, or perhaps beneficial—that we hope in time to see some means adopted in every city whereby all these bodies may be placed in such a manner that all their individual peculiarities shall be pointed out. Thus now-a-days, from want of knowledge comes unintentional poisoning, but from an evil application of knowledge comes indirect poisoning, and this is carried on through every branch of trade, under the name of adulteration. The London *Lancet* first directed the attention of the public to this subject, by publishing analyses of various articles of consumption bought promiscuously in small and large quantities. The examiner-in-chief was Dr. Hassall, who has since published a very valuable work on this subject, and from its pages we learn that almost every article that we eat, drink, or inhale, is more or less adulterated. Thus coffee is mixed with chicory; tea with sloe and tea leaves which have been previously used; bread with alum, potatoes, and all sorts of things; and cayenne pepper with red lead. Pickles are made green by sulphate of copper (verdigris); red lead and tumeric are common in preserved meats, tobacco and segars are made up of cabbage leaves, apple parings, and all kinds of rubbish; but what is worse than all is that many medicines are also mixed with articles perfectly contrary to them in effect, although perhaps having some resemblance in outward appearance. If a physician writes a prescription, and that, being made up by a druggist of adulterated drugs, does not act as the medical man expects, but injures the patient, is not the druggist or adulterator to be held responsible? In England this question has excited so much attention that there is an agitation on foot to appoint local inspectors of articles of commerce, who shall have the power of indicting any one who sells an impure for a pure article, and thus sending out not only an acted lie, but also great injury to the public health. We may be asked, how does this question affect *us*? We are not in England. Our storekeepers may be honest, while their's are not. There is no doubt they *may* be honest; but we must recollect that it is not mere dishonesty that induces adulteration, but that principle of trade which prevails equally on both sides of the Atlantic, namely, competition—the desire to obtain custom by underselling, and the folly of the public in patronizing the low-priced stores simply because they are low-priced.

We hope to see the people of this country arousing themselves to this inquiry, and making up their minds not to take poison in any shape or form whatever.

The Iron Age.

Poets have given to each age of this world's history a typical metal, one which has characterized and typified the leading features of civilization at the time, and which, so to speak, by its own physical properties and uses, has reflected the manners, customs and habits of the people then living. Following the idea of the poets, we call this the Iron Age; for if any period deserved such a name, it is that portion of time which we call "to-day!" Iron is our strength and stay; without it, the onward march of civilization must stop, and the word "Progress" be cancelled from our language. By a providential arrangement Iron is universal in its occurrence in nature, and by human ingenuity and talent it is universal in its application. Let us look, first, at its universal occurrence, and think how vast must be the quantity in the world. It is found in all the rocks that form the crust of our globe, in greater or less quantity, as may be seen from the prevalence of red and reddish brown in their colors; in all animals, for it is Iron that colors the blood; in all fishes, for it exists in the waters of the sea. Go where you will, and turn in any direction you may, Iron meets you at every step. There is, however, another consideration, and that is that we seldom find it in a metallic state, but usually combined with some other element, and this is providential also, for it stands as a kind of mighty tempter, persuading and urging man to exercise his talents, and to exert his genius, so that that dirty-looking lump of red earth called Iron ore may, by the workings of a man's talents, ingenuity and genius, become the steel pen with which we write; and we say with truth that no one substance on the face of the earth has done so much in the development of man's latent powers, in rendering our lives comfortable and luxurious, and in advancing harmonious feelings, and free intercourse among the nations of the world, as Iron.

Let us now turn to the universality of its applications. We cannot turn our eyes or thoughts in any direction without finding some purpose of use or ornament to which this metal has been successfully applied, and its peculiar characteristics render it peculiarly adapted to fill the wants of man. It is easily melted, so that we can run it into molds of whatever device or pattern we wish; and when cold it is so strong and firm that it seems to be a work of nature rather than one of art. It is easily welded, and by this process can be readily joined in any part that is fractured, or it can be bent while hot to any curve or shape. It is tough, and will resist the strongest crushing strain; is not easily acted upon by the atmosphere; so it is just suited for the position we have given it in this nineteenth century, in which, amongst our necessities and luxuries, our real and imaginary wants, it holds the place of the King of Metals.

The Gyroscope Paradox.

On page 200, Vol. 11, SCIENTIFIC AMERICAN, we published, for the first time in this country, an engraving of the above curious toy. Since that time it has been discussed by all classes and shades of thinkers, and as a natural result, all sorts of theories and explanations of it have appeared. Considerable flourish has been given by some of our cotemporaries to a theory of Mr. McCarroll, of Canada, as probably the correct one. He shows that the ring and wheel remain suspended so singularly on one side of the upright, from the fact that the resistance of the centrifugal force of the wheel to any alteration in the plane of its motion is greater than the force exerted by gravity towards making it alter that plane. And as to the ring revolving round the point of the upright, in a direction contrary to that of the rotation of the wheel, he asserts that a wheel in motion does not impinge on the same point of the axis that it rests on when in a state of repose.

"For instance," he observes, "when a vertical wheel is set in motion, one-half of the body is acting in opposition to the laws of gravity, and the other half, so to speak, in the line of gravitation—hence the unequal discharge of forces on the axis On one we have gravity minus velocity. In so far, then, as the end on the axis is to be considered, the point of the heaviest impingement will be found on the plus side of the wheel. This being the case, the ring, which is free to obey any impulse given in its own plane, must necessarily retire before an excess of force exerted on the plus side of the axis of the wheel."

The centrifugal force theory is not new, and Mr. McCarroll is not entitled to the credit of suggesting it; as to the revolving ring, the explanation wants proof, as there is no law in nature which will enable us to say that "the ring which is free to obey any impulse given in its own plane must necessarily retire before an excess of force exerted on the plus side of the axis of the wheel."

The American Institute Fair.

On Tuesday, the 15th, the twenty-ninth Annual Fair of the above well known institute was opened at the Crystal Palace. Although the day was fine, the visiters in the morning did not seem to be very numerous, but in the evening there was a tolerably large assemblage collected to hear the opening address by the Hon. Mr. Meigs, whose annual appearance in this character is as steady as the motion of the planets. It was a plain, but common-sense review of the progress of industrial science during the past year. He made many valuable suggestions with reference to agriculture and the mechanic arts, and expatiated on the power of Great Britain to whip half the world with her immense engineering power, etc. After which a panorama of the Rhine was unwound before the admiring eyes of the juveniles, evidently much to their delight. A band (which played lustily during the speech) enlivened the evening with airs—national and general; and so concluded the opening ceremonies. We cannot help remembering the old proverb, that "if a thing is worth doing at all, it is worth doing well," as it applies with great force to the opening ceremonies of the American Institute. Surely a speech—however good—delivered at the end of a long, narrow and inconvenient picture gallery, with music playing and noises being made in all parts of the building, could scarcely be appreciated by the auditory; besides, the oration came off half an hour behind time. We would have it understood that this was no fault of Mr. Meigs, as he was there in time, patiently waiting for the Committee of Management to make their appearance and hear him. When the committee did arrive, (each with a scarlet rosette in his coat to denote his membership,) and gravely sat down, the proceedings commenced and ended with little or no edification to any one. If the Institute intends to continue these official openings, should they not be something worthy a great society, and not the hurried, unsatisfactory things that they are? We would advise them, in future, to discontinue the opening farce altogether.

Now for the Fair itself. From the present appearances we think it will be one of the best that has been had, although at first, from inventors not sending in their objects of exhibition early enough, much space remains to be filled up, which we have no doubt will be speedily done. There is much in the way of machinery, some unpacked and not set up, and some little not yet unpacked; so that, this week, it is impossible to give anything like a detailed report, as very few departments, if any, were completed at the time of our going to press.

There seems to be about the average number of novelties in all departments, each of which will be noticed in due time. As a sign of the growing importance of this exhibition, we hail with pleasure the presence of a six-cylinder printing press, manufactured by Messrs. Hoe & Co. for a German newspaper, the *N. Y. Staats Zeitung*. These famous presses enjoy the highest repute, not only here, but also in England, where the *Morning Star*, a London daily newspaper, and that mammoth of the press, the London *Times*, are, we believe, shortly to be printed by its aid. When these large manufacturers come in and show the products of their genius and capital, we cannot refrain from thinking that it is a very healthy and prosperous sign.

We observe, also, a new cotton gin, which is intended to gin the cotton in the field and send it out, not in the shape of raw cotton in the bale, but as yarn from the plantation. Should this be worth anything, it must be worth a great deal; but even should it be successful, and cheapen yarn at the South, we doubt not the active inventor would contrive some method whereby he could successfully compete with it. The machine was motionless, and, as no one appeared to offer any explanation of its operation, we are obliged to defer our notice until another time.

We also notice a case of saws and other hardware goods from Messrs. Hoe & Co., at the end of the north transept. It is arranged with taste and elegance, and the goods themselves are of the first quality.

The motive power for the machinery is to be supplied by three boilers, each about three feet in diameter and thirty feet in length, and ought to furnish a sufficient supply of steam for all the purposes of the exhibition. Already, on a pipe provided for the purpose, about a dozen steam and pressure gages are put into use, and more will probably be added. The engines that are to effect the transformation of steam into power are three in number, all with horizontal cylinders. One is complete and in action, and works beautifully, with a motion as steady and true as the upflowing of the tide. It is sixty horse-power, and made by Messrs. J. S. Bunce & Co., of this city. Of the others, one is made by Messrs. Hinckley & Egrey, of Bangor, Me., and is now ready for use. Its cylinder is twelve inches in diameter and three feet stroke. The third (made by Messrs. Corliss & Co., of Providence, R. I.) is not yet put up. These engines will convey the power to the shafting by belting in the usual way.

It is with feelings of pride that we look around on the spectacle presented to us at the Crystal Palace: the merry face of the visiter as he passes up and down; the anxious look of the inventor, as a small crowd gathers around his invention to hear him explain its merits, and his look of joy when they signify their approval of his effort; everywhere, all around, has the genius of man seemingly run riot; and you cannot ask for anything of ordinary use or popular appliance, for which there cannot be found an improvement to supply your want. In times of old, this fairy scene of busy life and useful purpose would have been regarded as the work of fairies and genii; but now, not having these beings at command, we have raised another, which we call the Genius of American Industry, and this we use. It is this that nerves the strong man's arm in labor, that supports the weaker woman in the factory, that cheers and encourages the inventor in his closet, and our sailors on every sea; and greater than all this is the spirit of genius which appears to rule in the opening Fair. We shall gladly chronicle its progress since the gathering and dispersion of its curiosities last year.

Among other novelties, Robinson's Patent Spring Stairs seems to attract general attention, if we may judge from the numbers we have seen running up and down them to try their effect, and they are certainly a very novel application of a spring. On the middle

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stringer of a flight of stairs, a spring is placed under the top of each, and on this lies the stair top, being divided and hinged on the sides, so that when a person ascends the stairs he has the force of the spring to aid him in rising to the next, and in descending, the elasticity of the spring prevents the whole weight of the body from coming forcibly on the one foot, thus rendering "gitting up stairs" not such a fatiguing affair as in the ordinary solid stairs.

H. Getty, of Brooklyn, exhibits an Adjustable Hammock Berth. This invention consists in a convenient and comfortable mode of arranging the berths of ships. In the day time, it folds away and gives more room in the cabin; and at night, as it swings from two pivots, one at either end, however much the ship may roll, the occupier is perfectly quiet.

On a table in the south transept there are four models, each intended as an improvement on the usual form of ships' paddle-wheels; but we are sorry to say they are not of much practical use, as the nautical public do not seem to have sufficient confidence in them to ever adopt such contrivances. The first is composed of six floats, which, by means of an eccentric, feather themselves when leaving the water; and so large are the floats that they nearly form a perfect drum. The second is on the same general principle, having a greater number of smaller floats and a larger wheel. The third is a large wheel, having a number of small solid floats; their section is triangular, with slightly concave faces, and they are placed on an axis, so that each can rotate by itself when in the water. It is practically of no use; the friction is not so great, trnly, but the floats would simply revolve through the water, and exert very little propelling action on a ship. The last is a model of a method of arranging paddles without employing a wheel, and although the model is very small, it is almost as much as one person can do to turn it; what power it would take to turn a large one capable of propelling a vessel, it is beyond our arithmetical capacity to calculate. On the axle are fixed three eccentrics, arranged the same as a three-throw crank; round these are coupling joints, in the lower half of which are four paddles, radially placed, and the top of the couplings are fixed by means of levers. When the axle is turned, these paddles describe an elliptical arc, one-half in the water, the other out, and as four are always moving through the water, the inventor evidently thinks the ship would be propelled. It might be; but we should not like to pay the coal bills which an engine would naturally consume in its laborious efforts to drive the boat.

Every succeeding Fair of the Institute brings out a greater or less variety of devices which have not the merit of novelty, to say nothing of utility, to recommend them; and what is the more strange is that nearly all these old traps originate in, or very near to, New York city, the supposed centre of information. The four wheels above mentioned appear to have been born in this city within the past year. Arguing from this fact, and from our observations in the past, we believe that, in general, the mechanics and inventors of the country are better acquainted with the progress of invention than the same class in the city. We have reference to those who toil in the shop and at the lathe. Our city mechanics usually read story papers, and do not pay sufficient attention to the current progress of mechanical science.

Strychnine.

This poison, which has of late become so notorious in its abuse, (we cannot say use,) is the most uncertain in its action on the human frame; in some producing instant death; the same dose in others only bringing on tetanic convulsions, and in a lucky few no effect at all; and this does not appear to have any relation to the physical strength of the patient. It is a whitish crystalline substance, and is extracted from the nut of a tree called strychnine *nux vomica*. This tree grows in Ceylon, is of a moderate size, and has thick shining leaves, with a short, crooked stem. In the fruit season, it is readily recognized by its rich, orange-colored berries, about as large as golden pippins. The rind is smooth and hard, and contains a white pulp, of which many varieties of birds are very fond; within this are flat, round seeds, not an inch in diameter, covered with very beautiful silky hairs, and of an ash-grey color. The nut is the deadly poison which was well known and its medicinal properties well understood by Oriental doctors long before Europe or America had heard its name. "Dog-killer" and "fish-scale" are translations of two of its Arabic names. The natives of Hindostan often eat it for months, and it becomes a habit, like opium-eating, with the same disastrous results. They commence with taking the eighth of a nut a day, and gradually increase their allowance to an entire nut, which would be about twenty grains. If they eat directly before or after food, no unpleasant effects are produced; but if they neglect this precaution spasms result. The chemical tests for it are numerous, but only one or two can be relied upon as thoroughly accurate.

The British and American Patent Offices.

The London *Engineer* has the following article, comparing the English and American Patent Offices:—

"We had no idea of the cribbed, cabined, and confined nature of our own little nest, in comparison with the vast aviary in which we have been accustomed to be fleeced by our Transatlantic friends, before we had the plans drawn out on the same scale, or we think we should have hesitated to make such an *exposé* of our deficiencies; but the plans being prepared and promised to our readers, we feel bound to bring them to the light, let the consequences be damaging as they may. We had read of the sizes of the various rooms of the American office, as stated in the published description of it, and we had seen the plan; and, further, we knew well the ins and outs of our own Patent Office, but never, until the plans were placed side by side, did the comparison appear so ridiculous. We do not say that some of the closets of the American office are as large as our patent library, but really the space occupied by the entire building is so vastly greater than our own little jewel in Chancery lane, that we are at a loss to know what use can possibly be made of it. It is true that the plan of the American office, as we have given it, is not yet completed—one portion having to be built, and other portions being occupied by different departments of state; yet for all this, the building was designed for the Patent Office alone, and to the purposes of this office alone will it very shortly be devoted, so that we may justly conclude, from the size of the entire building, what views the Americans entertain of the importance of the patent business of their country. In one of *our* departments the space is so confined that we have recommended the attendants to wear spring shoes, so that they would, after a little practice, be able to jump over each other's heads; there being no room to pass between the shelves and the backs of the chairs of those sitting at the central table. With respect to the store department, there is only sufficient room in the corrugated iron out-house to contain a few copies of each of the printed specifications, which space will be wholly inadequate when the specifications of the patents granted under the old law are all printed. As to a museum of models, it does not exist, except in one of the boilers at Kensington; and as recent events, to which we referred last week, give signs of an explosion in that quarter, no safety-valve having as yet been discovered—it is not impossible that the models may again have to be placed in their respective cases, and consigned to the cellars from which they were taken. Now, this is all too bad, especially when we consider that the patent fund, notwithstanding the excessive fees of the law officers, has accumulated to the extent of about £100,000. Patentees will never, as was at one time suggested, have any part of this fund returned to them, and why, we want to know, would it not be as well employed in building a respectable office as in remaining in the Treasury? The business done in our Patent Office is not less important than that of the United States office; then what makes the difference in the views entertained as to the amount of space required for the proper transaction of that business? The real fact, we suspect, is that no difference of opinion exists as to the space required, but there are some undefined uses to which it is supposed the accumulated fund may be hereafter applied, and which time has not yet revealed. We beg to suggest that this expected revelation, when it is made, should be nothing more than that the whole fund, if necessary, should be expended in building a new Patent Office, containing ample space for every department, including a museum for models; and we venture to hope, further, that the revelation will show that a situation near Chancery lane is in every respect the best for such a building."

Carbon.

Carbon is surely a kind of sylph, or sprite, and that, too, of no ordinary sort. The caterpillar changes its coat, and becomes the gorgeous butterfly, and this astonishing transformation is the theme of the fabulists. Far more wonderful, however, is the change which takes place in a piece of charcoal. From a black, opaque, and almost worthless material, it changes to a brilliant gem—the diamond, which even the stars are likened to. It certainly appears incredible that the diamond, so transcendently beautiful, sparkling with more brilliancy than the dew-drop at sunrise, should be nothing else than a bit of charcoal, but so it is. Not here, however, does the chameleon power of carbon rest, for by another change it becomes invisible. In such a state it exists in the brightest, purest air. By another change it becomes the thick, heavy flakes of smoke which we see roll out of ill-constructed flues—the "blacks" of London and Birmingham. Coal is but impure carbon, hence it is often spoken of as the "black diamond," signifying, however, as much the intrinsic value of coal to man as its chemical relationship to the sparkling gem. How the world would fare without carbon it would be difficult to say, for it forms the major part of the vegetable and animal creation. Tallow is white, but it is composed of nearly all charcoal (that is, carbon,) and the elements of water. So also with starch, sugar, spirit, gas, chalk, shells, bones—all contain carbon; they would, in fact, cease to exist without it. If we make a mixture of sulphuric acid and sugar, a volcanic commotion ensues. When all is over, and the black residue washed, it is found to consist of nearly pure charcoal (or charbon, as the chemists in France call it,) or carbon, as the English write it—having a dislike to the *h*. The purest carbon or charcoal with which the chemists are acquainted is the diamond; but even this valuable stone, when burned, shows by its ashes that it is of vegetable origin. Looking at carbon, therefore, either in its black or white condition, and knowing that it exists in the atmosphere around us in an invisible state, we need not any knowledge of chemistry or physics to enable us to come to the conclusion that few substances exhibit the infinite power of the Creator more than carbon. SEPTIMUS PIESSE.

The Action of the Sea.

That ever restless mass of water, called the sea, or ocean, is the great agent in producing the physical changes of the globe. It is the only workman who never rests—always working, always toiling, for the good of man. It is continually wearing away the rocks and beaches of portions of our coasts, and carrying the matter onward in its currents, to form islands or to add to continents in other places. The motion of the waves produces a sifting action, and only the heavy matter falls to the bottom, while light alluvial soil and small sand is held suspended in the upper strata of the water. We can realize the force of the waves in wearing a coast by remembering that in a hurricane the force of the waves are equal to a pressure of forty tuns to the square foot of coast surface. What can withstand this? We feel that all our breakwaters and stone walls must give way in time, however long that time may be. The buildings of man must fall before the forces of Nature.

Mathematics.

Mathematics is the most noble and elevated science the human mind can investigate or study. Each question that the student undertakes to solve, when accomplished, but leads to another and a higher, and thus leads the intellect to consider and grapple with the grandest realizations of truth in our universe. All other sciences (except those relating to living beings) are based upon it. Astronomy, its eldest child, and Mechanics, its most useful servant, are but practical mathematics. How grand and noble to calculate the distances of stars, the motions of the planets, and to prophecy the appearance of a meteor! and how useful and glorious, as advancing true civilization to calculate the horse-power of a steam engine, to estimate the extent of a bed of coal, or to determine the practical strength of iron! All these are done by the aid of this science, and the world teems with objects for its investigation.

Loss of the Central America.

This steamship left Havana for New York on the 8th inst., having on board about six hundred passengers, chiefly returning Californians, and $1,600,000 in specie, which was lost beyond recovery. Up to Saturday, the 12th, they had a storm, which increased in violence, and on that night the ship foundered, when five hundred passengers, it is supposed, were lost; the remainder were saved by various vessels sailing in the vicinity. No more particulars had been received up to the hour of our going to press. This calamity will sadden the circle round many a household fire, and in place of the look of pleasure and cry of joy which would accompany the welcome home of every one who had been toiling for years in the land of gold, we shall only see the look of anguish and hear the wail of grief.

The Great Eastern.

At a late meeting of the Eastern Steamship Company, it was announced that the vessel may be launched in September, but that the trial trip to Portland, Maine, will be deferred to the April following. Her total cost will amount, including all contingencies, to about three millions of dollars, of which nearly one remains to be met. Of this, $160,000 will be provided by calls at present in arrear, and to supply the balance of $490,000 the directors are empowered to borrow $500,000 upon debentures.

Ventilation of Cars.

In traveling by railroad, the unfortunate individual who chances to be in the cars all night must either catch a severe cold, by having one or more windows open, and in dry weather nearly choked with dust, or else poisoned with the malaria arising from the burning of lamps and breathing of passengers. Surely this can be remedied. It would cost the railway companies but little to adopt some of the known systems of ventilation which would answer all the purposes required, and they would be amply repaid by the increased comfort of their patrons.

The Parisian newspaper, *Galignani*, says:—"M. Babinet, the astronomer, has just announced to the Institute that, in consequence of a favorable change in the currents of the ocean, a series of years of heat has been entered on, of which the present is the commencement." We can only say that, if this is the first year of M. Babinet's series of years of warmth, it is the coldest that has been known in the United States for a long time. However true this fact may be as regards Paris, it certainly has not affected New York.

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Correspondents

NOTICE TO OUR CORRESPONDENTS.—No communication can receive our attention unless it is signed in full with the name of the writer. Our friends are particularly requested to bear this rule in mind when writing to us.

If our "Magic Lantern" friend will send us his address, he will be answered in our next number.

H. P., of Mo.—Your plan for removing the waste and nightsoil of a city, without throwing it into the rivers, by having it carried in boxes to some place outside and there left to decompose, to prevent the poisoning of the water, is comparatively old, and was practised in New York some years ago. There is one very serious objection to such a plan, and it is this, that when the wind blows from the direction of the place of deposit towards the city, it is very apt to bring along with it odors the reverse of pleasant, and pestilential in their nature.

R. C. L., of St. Louis.—There are several patent looms for weaving wire. The only one to which we can refer you for a description is that of G. W. Smith, illustrated on page 176, Vol XI., SCI. AM.

I. B. H., of ——.Let your friend Mr. A. open a correspondence with us in regard to his rejected case. We will do all we can for him. Thank you for those subscribers.

S. A. Arnold, of Beloit, Wis., wishes to obtain the address of Thomas Ling, who patented a pump in 1855.

M. J. H., of N. Y—Your pile-driving apparatus seems to possess novelty, and we are of the opinion that you had better send us a sketch and description of it for examination.

H. H., of Pa.—The best material for polishing cast iron is flour emery, first used with oil, and then dry. The ordinary mode of proving a steam boiler is by hydraulic pressure. Boiler makers have pumps specially constructed for the purpose.

George Tatwiler, of Dayton, Ohio, wishes to get information in regard to the proper time to cut his tobacco crop. We have no personal experience on this subject. No doubt some of our readers can inform him.

C. J. S., of Conn.—Probably the reason why you did not get our answer to your letter was because you failed to sign your name to the communication. We require this to be observed by all our correspondents.

S. D. C., of Wis.—We do not now know of any special encouragement at present to attempt to bring out new modes of signaling for railroads. There does not seem to be much interest on this subject among railroad men at the present time.

J. McV., of C. W.—Thank you. We will look out for that "catching fish" business hereafter. We consider it a humbug.

Joshua Beal, Baton Rouge, La., wishes to procure the best known machine for making large hominy; also, a power mill for crushing and grinding corn and cob for feed.

A. J. D., of Cal.—We do not discover anything patentable in your crusher. Springs having been applied to the stamps, the substitution of a different kind of spring cannot be considered an invention, and we discover no other essentially novel feature. In reference to an artificial leg, write to Palmer & Co., of this city. We have not time to attend to your *outside* commission.

L. E. O., of N. Y.—"I hope you will not denounce me as visionary for asking whether there is not a standing offer by the British Government for a machine which will propel itself? Would our own government be likely to give anything for a machine of this kind? What would the concern be worth if it could be used as a motive power? My theory of the perpetual motion is *absolutely infallible*." We answer first, that the British Government is made up of too many scientific men to permit it to act the foolish part of stimulating attempts to produce perpetual motion by offering a prize for its discovery. Second, the United States Government has never proposed to get an impossibility, therefore it cannot probably be induced to take an interest in such an invention. Third, it would be worth millions of dollars if capable of being applied as a motive power. Your theory may be all very nice, but the only difficulty in it we deem to be that it cannot be reduced to practice. Remove this obstacle, and you are sure of success.

"A Citizen," of Worcester, Mass., is informed that the laws are adequate to protect an inventor in his legal rights. If, however, he misplaces confidence, and assigns his right to irresponsible parties, it is an act of his own, and the law cannot intervene. We are sorry to hear of the case you mention. If the patentee has been defrauded, he has his remedy by invoking the protection of the courts.

T. McG., Jr., of Ohio.—We are unable to say precisely to what extent it is desirable to allow the cushioning of the steam in the cylinder; but great care must be taken in not allowing the principle of operation to be carried too far, or the loss of effect of the steam on the other side of the piston will be serious.

S. A., of C. W.—We have often known condensers to be applied without air pumps to high pressure engines to condense all or the greater part of the exhaust steam. We have also known of many substitutes for force pumps for supplying boilers. Your application of the condenser is not patentable. We can give no opinion of the means by which you dispense with the force pump till you inform us what those means are.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, September 19, 1857:—

H. O. E., of N. Y., $30; G. C., of N. Y., $20; W. B., of N. J., $30; P. C. C. Jr., of N. H., $55; G. B., of Ark., $50; J. H., of Ind., $30; H. O. A., of La., $25; C. O. L., of Vt., $25; J. A. W., of Iowa, $25; J. D. S., of N. Y., $55; A. A. N., of Ill., $33; E. L. G., of Conn., $30; E. P. R., of N. Y., $30; M. J. F., of N. Y., $200; B. F. S., of Vt., $25; W. S., of O., $30; E. B., of Wis., $55; E. H. D., of ——, $25: T. M. S., of Ga., $55; S. & T., of Conn., $35; W. H. T., of Ill., $25; W. & R., of Vt., $30; D. R. & M., of N. Y., $250; H. S. B., of N. Y., $30; C. & W., of N. Y., $60; J. P., of L. I., $20; T. D., of Conn., $25; G. & Co., of Ill., $25; E. G., of Mass., $25; J. R., of La., $20; A. B. D., of Conn., $25; G. T., of N. Y., $20.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 19, 1857:

D. W., of O.; N. A. P., of Tenn.; C. O. L., of Vt.; H. O. A., of La.; J. A. W., of Iowa; A. B. D., of Conn.; J. P., of Wis.; L. & B., of Mass.; J. W., of N. J.; L. T., of Ky.; E. G., of Mass.; T. D., of Conn.; S. & T., of Conn; W. H. T., of Ill.; C. F. B., of O.; B. F. S., of Vt.; M. T., of Ill.; G. T., of N. Y.; P. C., of Conn.

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No. 128 Fulton st., New York.

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Yours, very truly, CHAS. MASON.
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IMPROVED WRENCH—WITHERELL'S Patent—State and County Rights for sale, and wrenches furnished to purchasers at the lowest manufacturers' prices. For engraving and description of this Wrench see Scientific American, No. 2, Vol. 12. Address O. O. WITHERELL,
Danville, N. Y.

A NEW AND SCIENTIFIC INVENTION.—Dr. Cheever's Galvano-Electric Regenerator.—Patent issued January 15, 1856. A circular relating to the use of the instrument, embracing a general treatise of atony of the spermatic organs, the result of which tends to softening the medullary substance of which the brain is composed, may be had gratis, and will be sent to any address by mail by their indicating a desire to receive it. All letters should be directed to Dr. J. CHEEVER, No. 1 Tremont Temple, Boston.

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PEARSON CROSBY'S PATENT RE-SAWING MACHINES.—The Crosby patent for re-sawing lumber, having been re-issued April 28, 1857, and having purchased the right to the same for the State of New York and Northern Pennsylvania, the subscriber is prepared to sell rights to use the machines in the greater portion of the above named territory, and also to furnish the public with these machines. Having re-built my machine manufactory—which was destroyed by fire on the 9th of February last—I continue to manufacture and have on hand for sale, Woodworth's Patent Planing Machines, from $150 to $1,500, and of a quality unequaled by any other manufacturer. Also the separate parts of the machine, namely, planing knives, side tools, side cutter heads, cylinders, &c., as well as the above named Crosby Re-sawing Machines. JOHN GIBSON,
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TO INVENTORS AND MANUFACTURERS.—Rooms with power, for the exhibition of machinery, can be had in the Depot Buildings, corner of Elm and Franklin streets, New York. The location is extremely desirable for its prominence and convenience to the business part of the city. Apply to T. BENNETT, on the premises.

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Science and Art.

A New Planet.

The forty-fourth of the minor planets was discovered by M. Goldschmidt, at Paris, on the 27th of May. The planet resembles a star of the 10.11th magnitude. A new star has been discovered in the nebula of Orion, by M. Porro, at Paris. It was first seen by him when trying an object-glass of 20.5 inches in diameter, the eye-piece magnifying 1200. He has again seen it twice, and his observations have been since confirmed.

Steam Fire Engines.

We notice from the proceedings of the City Council of Chicago, as reported in the *Press*, that after a careful examination into the relative merits of the various steam fire engines, an order has been given to Silsby, Mynderse & Co., of Seneca Falls, for one of Holly's engines, which has been recently tested with satisfaction in that city. A beautiful illustration of it will be found in No. 10, Vol. XII., of the Scientific American. We are decidedly in favor of the steam fire engine; and a city true to its interests will never tolerate the reckless system so generally prevalent, especially in large cities. With good steam fire engines, well manned, and a strong body of mounted police, we believe millions of property might be saved, which is now either stolen by running thieves, or suffered to be destroyed through the careless neglect of undisciplined fire companies.

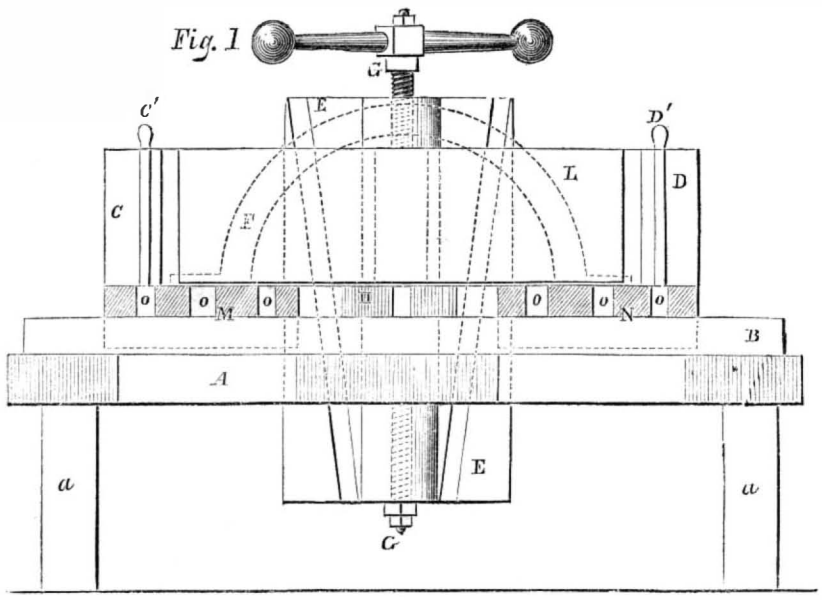
Improved Device for Upsetting Tires.

The accompanying engravings represent two views of the machine, Fig. 1 being a longitudinal vertical section, and Fig. 2 a plan or top view; the same letters refer to similar parts in both. A represents a flat bed or plate, which may be of cast iron, and supported at a suitable hight by pedestals, *a*. On the upper surface of the platen, A, guides B are placed, between which ledges on the underside of blocks, C D, are fitted and allowed to slide freely. To the back sides of the blocks, C D, inclined oblique projecting ledges, C′ D′, are formed. These ledges extend from the top to the bottom of the blocks, and are fitted in oblique grooves which are made in a sliding plate, E, which is moved up and down by means of a screw, G. The upper part of the screw passes through the center of a curved bar, F, which has a thread cut in in it, in which the screw works. H represents a plate permanently fixed to the bed, A. This plate has a slot made longitudinally in it, and a head, I, is placed on it, the lower part having a tenon on it that fits into the slot in H. The head is allowed to slide freely on the plate, H, and is moved backwards and forwards by a screw, K, which passes through an upright, H′, fixed to the plate. The inner side of the head, I, has a dovetail projection, J′, in it, and a curved plate, J, is secured to the head by ledges, J′, formed on the back of it, the dovetail projection being fitted between the ledges which form a dovetail recess. To the ends of the plate, H, and directly between the two blocks, C D, an upright, H″, is secured by being dovetailed into the plate, L, which is curved to correspond with J. The blocks, C D, are attached to the horizontal plates, M N, which are in the same plane as H, these plates are slotted longitudinally as shown at O. Three slots are shown, but more or less can be used as desired. In the outermost slot of each plate there are two heads, N′, N″, and M′ M″, The inner sides of these heads are grooved, and wedges, R S, are fitted into the grooves. The innermost heads, M″ and N″ have a sharp edged jaw, M‴ and N‴, attached, and corresponding jaws, C″ D″, are placed on the blocks, C D, near their outer end.

The operation is as follows:—Suppose a tire is to be upset, the thinnest portion of the tire, W, Fig. 2, is heated and placed between the two curved plates, L J, the heated portion being in the center of the plates. The plate, J, is then moved up to the tire by turning the screw, K; the wedges, R S, are then driven downwards, and the jaws are driven into the tire. These jaws serve as clamps, as they are only beveled on their outer sides. The blocks, C D, previous to clamping the tire, are distended or forced outward by depressing the

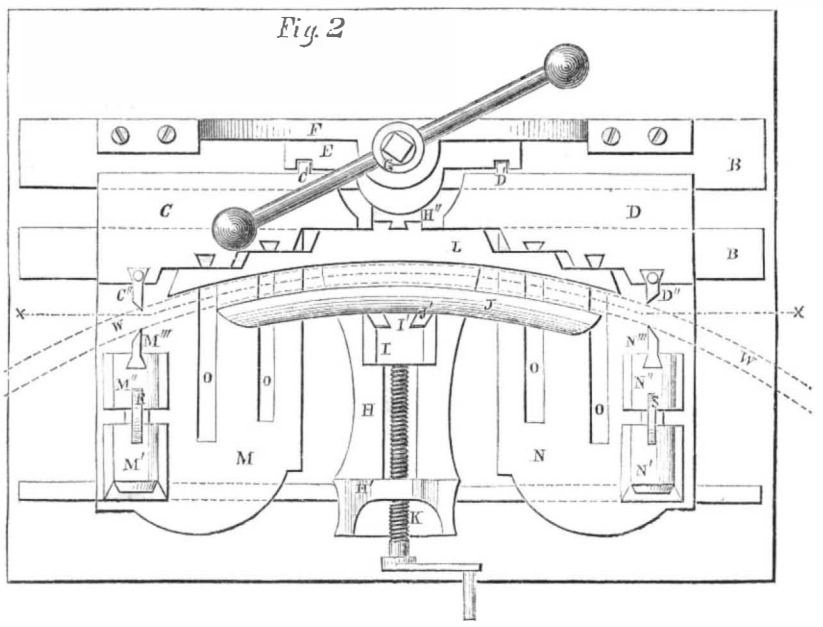
HAZEN & GIBBS' DEVICE FOR UPSETTING TIRES.

Fig. 1



plate, E, and turning the screw, G; when the tire is clamped, the screw is turned in the opposite direction, and raising the block, E, forces together the blocks, C D, thus compressing the tire, or as it is technically called upsetting it. Straight bars can be upset, as well as curved ones, by simply removing the curved bars, L and J, and placing straight ones in their place. Machines have been used before for upsetting the tires of wheels, but in them the blocks, C D, or their representatives, were brought together by right and left screws,

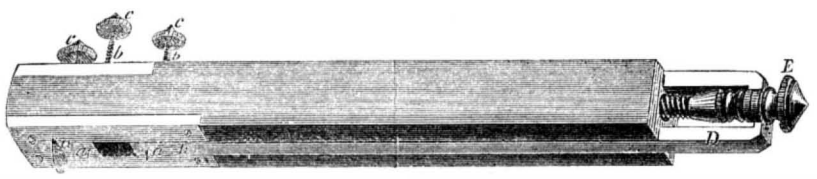
Fig. 2



and as these had to be cut very fine to economize power, they soon stripped and became useless in this invention; however, when the power of the screw is used through the medium of the sliding plate, there is little danger of this accident, and moreover the screw can be placed either forward or behind the inclined ledges as may be most desirable.

For further information and particulars, address the inventors and patentees, Messrs. Hazen & Gibbs, Homer, Michigan. The machine was patented July 7, 1857.

BRYANT'S PATENT GAGE.



Our engraving shows a carpenter's gage, made under the patent granted April 11, 1857, to Joel Bryant, of No. 8 Clinton street, Brooklyn, N. Y. The novelty consists in attaching the points or markers, *a*, to holders, *b*, which are provided with screw threads; by turning the buttons, *c*, the markers, *a*, may be either projected or withdrawn from the face of the gage at pleasure. It matters not whether the markers, *a*, have round points or knife edges. One or more of the markers, *a*, and holders, *b*, may be rendered laterally adjustable by attachment to a slide, D, as shown in the drawing. This slide is moved by the screw, E, the thread of which enters a suitable nut at the extremity of the gage.

This is a simple improvement, but it is one of much utility. A gage thus made presents a threefold advantage. When two of the markers is projected, it serves as a mortise gage; when they are withdrawn it is a single gage; and by removing the rouud points and substituting cutting edges (which may be readily done) the instrument becomes a cutting gage. The depth of cut given to the markers may be regulated at will. Address the patentee, as above, for further information.

According to a calculation recently made by M. Pouillet, it is fonnd that the quantity of heat which this earth receives from the sun in a year is equal to the combustion of a strata of coal the diameter of the earth and seventeen inches thick.

Literary Notices.

Hall's Journal of Health, for September, contains, as usual, some good common-sense advice on subjects connected with health. The editor says his aim is to show how disease may be avoided, and that it is best when sickness comes to take no medicine without consulting an educated physician. We have a friend in this city who has been for some time past apparently afflicted with a deranged liver. He has been very friendly to the "family physician," and has gracefully swallowed his potions, under the belief that the diseased liver would soon be restored to its original soundness again. While laboring under a fit of *low-sterics*, we invited him to take a trip to the West in our company, and on journeying to the land of corn and wine, he accidentally fell into the society of an intelligent Eastern physician, who had practised the healing art for twenty-five years. Our friend made known his complaint, and the physician at once informed him that, after a long experience in such cases, he could give a prescription which he thought would greatly benefit him. Eager for relief, he seized the paper upon which the talismanic hieroglyphs were supposed to be written, which, when carefully manipulated by the apothecary, were to restore the liver, drive away the sallow countenance, and once more refresh the animal spirits. To his surprise he found the slip to contain only these words—"Take no more medicine!" He took the hint, and his experience has made him a wiser man, and he has, we believe, a better liver. This prescription may be of some service to other of our friends, who watch with interest for some newly-discovered nostrum, which will at once, as if by magic, restore dilapidated Nature. To such we can recommend *Hall's Journal of Health*.

A New Phase in the Iron Manufacture is the title of an illustrated pamphlet, of 84 quarto pages, containing valuable statistics and other useful and interesting information concerning the growth and present condition of the iron trade, both here and abroad; together with 250 engravings and descriptions (with prices) of the multifarious manufactures of the New York Wire Railing Co., whose agent, J. B. Wickersham, of 312 Broadway, this city, forwards copies of the above valuable work, postage free, on receipt of four three-cent stamps.

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